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THE COVER

For the first time in many months the cover on this issue of *DISTRIBUTION AGE* does not offer a picture with a story tie-in. Because of the extreme importance of special features inaugurated in this issue, the Editor felt that those features deserved to be highlighted on the cover. It is hoped that after inspection of the Handling Guide, Statistics and Specifications—you will agree.

DISTRIBUTION AGE

ESTABLISHED 1901

Chestnut and 56th Sts., Philadelphia 39, Pa.

VOL. 52, No. 4

APRIL, 1953

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APRIL, 1953

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See how Airslide® cars can cut your shipping costs—
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A Penny for Your Thoughts

This issue marks a new milestone of continuing editorial leadership for DISTRIBUTION AGE. This sounds like a brag. Maybe it is. What matters to us is will YOU think that we have cause for justifiable pride in the contents of this issue?

Since 1901, DA has been publishing articles that showed the way to successful business methods, better management, and cost reduction. The way was FACTS—the tool executives need most in the successful conduct of their businesses. But that, alone, was not our claim to distinction. It was giving you those facts FIRST, COMPLETE, and properly ORGANIZED.

The course varied according to the times. Sometimes there was greater emphasis in one field than another; but, always, where needs appeared to be greatest.

In these times, when industry cannot afford the luxury of manual handling, DA has been placing editorial emphasis on mechanized handling. It has done so in the past, when labor supply was scarce—especially during World Wars I and II.

As a matter of fact, it was during those periods that DA gave industry its first, complete and properly organized facts on materials handling—long before any specialized materials handling publication was in existence. Had space permitted, we intended to republish some of our “old data” to show that they are as applicable today as they were decades ago.

Current industry problems indicate that the need for similar data is as great, if not greater, today than in the past. Therefore, in this issue, we are inaugurating the publication of similar practical data on a periodic basis. You will find, for example, 12 pages of industrial truck specifications that should prove very valuable.

We are particularly proud of our “Master Chart of Basic Materials Handling Systems.” There, on one sheet of paper, you have every handling system, every major item of basic equipment and principal accessories available today. The data are organized by fundamental handling operations; permitting you to solve either one special problem or coordinate and integrate handling in your entire operation.

The pages that follow describe the equipment in detail and outline basic applications. The data are arranged according to the index numbers on the Chart.

This special feature has been months in preparation. Its cost has run into thousands of dollars. We give it to you with our compliments—and a penny. The penny is for your thoughts: Do you like the data? Want more?

Yakkety Yak

Too bad that none of the windows of the Yucca Flats bomb test houses had industrial glass. America's industrial plants are more likely to be an enemy target than private dwellings.

... Speaking of atomic blasts, what do you think of the one set off by Secretary Weeks on the Bureau of Standards?

... And speaking of glass, we're still determined to install a sizeable piece of plate in the bottom of our boat to see if there really are any fish in the bay where we spend so much time angling.

... New Angle: From Italy we learn that a simple parliamentary ruling squelched a filibuster that squashed deliberation, dignity and a few Italian Senators. The ruling: The interpolations were irrelevant and, thus, not admissible in discussion of the major question.

... Another New Angle: Soviets cut prices instead of throats.

... Now that we can pronounce Trygve Lie, we've got to start all over again with Dag Hammarskjöld.

... Most things McCarthy did always were Greek to us.

... Credit men report installment delinquencies are rising. A western banker has a special staff for repossessing Cadillacs.

... Don't worry about your station in life; someone always is ready to tell you where to get off.



Editor

5TH NATIONAL MATERIALS HANDLING EXPOSITION

See the largest and most comprehensive array of materials handling equipment ever assembled in one place and at one time! More than 250 companies will present and demonstrate six acres of machines, supplies and services that are today's pacemakers for cost reduction and operating efficiency.

Top experts will examine new developments in materials handling techniques at conference sessions concurrent with the show.

For information, address
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APRIL

Chuting the NEWS

Detroit Chapter DTA Holds First Board of Directors' Meeting

Roy Fruehauf, president of the Detroit chapter, National Defense Transportation Association, hosted the first board of directors' meeting held recently at his company's Detroit offices.

Those attending included Charles W. Bishop, general counsel; C. L. Jellinghaus, New York Central Railroad; Norbert J. Brennan, chapter vice president, Chrysler Corp.; Homes Bannard, Pennsylvania Railroad; W. C. Leonhardt, Manufacturers National Bank of Detroit; Lt. Col. John T. Heston, Detroit Ordnance District; W. J. Powell, Greyhound Bus Co.; L. C. Allman, The Allman Co.; Jack Tompkins, American Airlines; Arthur R. Forster, General Motors Corp., John Wallace, Ford Motor Co.; J. C. Barden, Geo. F. Alger Co.; Frank Baird-Smith, Refiners Transport Co., and C. M. Boutell, president, Boutell Drive-away Co.



Francis Shaughnessy (left) receives gavel of authority as new president of the Boston chapter SIPMHE from Alvin S. Roberts (right) national vice-president with John J. Reynolds, Jr., vice-president of the new chapter looking on. The Boston chapter will be host to the annual SIPMHE exposition in Oct.

Sowell Reelected President Wirebound Manufacturers Assoc.

Joseph A. Sowell of Brewton, Ala., was reelected president of the Wirebound Box Manufacturers Association at its annual meeting held in Boca Raton, Fla., March 4-7.

A. L. Whiton of Chicago, Ill. was reelected vice-president and L. S. Beale of the association's Chicago headquarters was reelected secretary and treasurer.

Two new directors, Kenneth H. Leash of Portland, Ore., and Donald K. Gooding of Wausau, Wis., were elected. Directors reelected are S. J. Adkins, Gainesville, Fla.; J. C. Brill, Chicago, Ill.; J. A. Cragwall, Des Plaines, Ill.; L. O. Crosby, Jr., Picayune, Miss.; G. H. Kubes, Cleveland, Ohio; F. J. Martin, Jr., Toledo, Ohio; J. R. Miller, Jr., Brewton, Ala.; Shelley Schuster, New Orleans, La.; and D. R. Simmons, Bainbridge, Ga., and A. L. Whiton.

(Please Turn Page)

Coming Events

Apr. 8-9—Wisconsin Household Goods Carriers Bureau, Foeste Hotel, Sheboygan, Wis.
Apr. 9-11—California Moving & Storage Assn., Hotel del Coronado, Coronado, Cal.
Apr. 12-16—Refrigerated Warehouse Industry Training Conference, Sheraton-Belvedere, Baltimore, Md.
Apr. 16—Minnesota-Northwest Warehousemen's Assn., Minneapolis or St. Paul, Minn.
Apr. 19-22—Customer Relations Council of the ATA Spring Meeting, Bellevue Biltmore Hotel, Belleair, Fla.
Apr. 20—Packaging Institute, Annual Spring Luncheon, Chicago, Ill.
Apr. 20-22—American Railway Development Association, 44th Annual Meeting, Mobile, Ala.
Apr. 20-23—American Management Association, Packaging Conference and Exposition, Navy Pier, Chicago, Ill.

May 6—National Traffic Committee of the trucking industry, Washington, D. C.
May 6-9—Chain Store Traffic League Annual Meeting, New Orleans, La.
May 11-14—ATA Councils on Safety, Maintenance, Equipment and Terminals, Adolphus Hotel, Dallas, Tex.
May 13-14—National Association of ICC Practitioners, San Francisco, Cal.
May 16-17—Associated Warehouses, Inc., Annual Meeting, Washington, D. C.
May 17-21—American Warehousemen's Association, 62nd Annual Meeting, Washington, D. C.
May 18-23—Fifth National Materials Handling Exposition and Handling Conference, Convention Hall, Philadelphia, Pa.
May 22-23—Virginia Movers & Warehousemen's Assn., Natural Bridge, Va.
May 23-24—Delta Nu Alpha, National Spring Meeting, Chicago, Ill.
May 26-28—Freight Station Section, AAR, Annual Meeting, Detroit, Mich.

June 2-4—Accounting Division, AAR, Chicago, Ill.
June 15-19—Exposition of Basic Materials for Industry, Grand Central Palace, New York, N. Y.
June 21-26—C.W.A. Convention, Royal Alexandra Hotel, Winnipeg, Canada.
June 23—American Short Line Railroad Association, Membership Meeting, Atlantic City, N. J.
Aug. 9-11—Annual Assembly, Movers Conference of America, Sheraton Hotel, Chicago, Ill.
Sept. 10-11—American Society of Traffic & Transportation, Biennial Seminar, Pittsburgh, Pa.
Sept. 15-19—1953 ATA National Truck Roadshow, Minnesota State Fairground, Minneapolis-St. Paul, Minn.
Oct. 12-14—Packaging Institute 15th Annual Forum, Hotel Statler, New York.
Oct. 20-22—Society of Industrial Packaging and Materials Handling Engineers, Exposition, Boston, Mass.

Chuting the NEWS

(Continued from preceding page)

Convention and Visitors Bureau of Los Angeles Accepting ATA Hotel Reservations Now

Reservations for the 1953 convention of the American Trucking Associations, October 26 to 30, are being accepted by the Convention and Visitors Bureau of Los Angeles.

Requests for sleeping rooms should be addressed to Allen K. Pollock, manager, Convention and Visitors Bureau, Los Angeles Chamber of Commerce, Los Angeles, Cal.

ATA will not undertake to make hotel reservations and that in no

case should such applications be directed to ATA. State associations managers have been provided with a schedule of rates, a list of hotels in the vicinity of the convention hotels, and other details.

Applications from allied industry members for hospitality rooms should be addressed directly to the hotels, where Richard J. Hewitt, sales manager, is handling such matters for the Statler; and Francis Bustillo, convention manager, is contact man at the Biltmore.

—DA—

A. L. Green Honored

A lifetime membership in the Society of Industrial Packaging and Materials Handling Engineers was presented to Al L. Green, former national director, at a recent meeting of the Illinois Division. Green, widely known as 'Mr. Claim Prevention,' recently retired as a special representative of the Association of American Railroads.

—DA—

Parcel post restrictions, proposed parcel post rate increases and railroad service will be on the docket when the Chain Store Traffic League gathers for its annual meeting May 6-9 in New Orleans,

—DA—

AWI Annual Meeting

Associated Warehouses, Inc. has announced plans for its annual meeting, May 16-17, at the Shoreham Hotel, in Washington, D.C. Discussion by the 60 or more members who will attend is expected to center around an enlarged sales program, plans for expansion of space facilities and remodeling and streamlining programs.

Three new warehouses were recently accepted into AWI membership: Roberdeau Van & Storage Co., Austin, Tex.; Belt Route Warehouse & Storage Co., Kankakee, Ill., and H. C. Cockrell Storage Co., Richmond, Va.

Wunsch Award Winners

William R. Milligan, Ottawa, Ill., was the first award winner under provisions of the Wunsch Foundation Award Fund. V. H. Simon, Chicago, Ill., was second place winner. The awards were presented at the recent semi-annual Board of Directors Meeting of the AMHS. The winning paper was titled, "Handling Glass Cullet."

—DA—



Distinguished service awards for outstanding contributions to the trucking industry were made in New York recently at the National Transport Vehicle Show & Fleet Maintenance Exposition to H. D. Gorman (left), president, Chicago Express, Inc., and C. A. Pascarella, general traffic manager, Francis H. Leggett Co., by C. A. Weymouth, assistant to the president, Associated Transport, on behalf of the National Awards Committee. L. S. Carroll, president, Red Circle Trucking Co. and Empire State Highway Transportation, is shown on the extreme right, next to Weymouth

"The Old One-Two!"



Perfect Shipping Month

April, Perfect Shipping Month, offers an opportunity for all traffic clubs to make a substantial contribution to the cause, according to a reminder from the Associated Traffic Clubs of America.

The association advises club programs that not only focus attention on claim prevention, but which will result in a continuous program that will be followed up by members in the industrial and transportation field during the year.



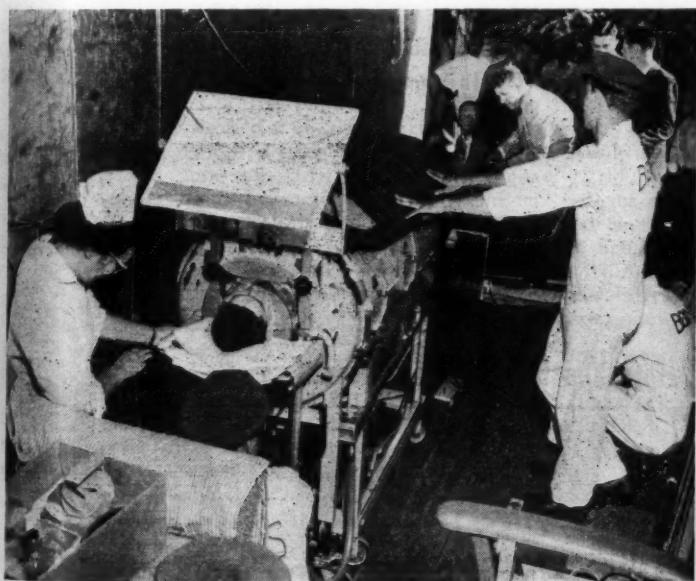
Richard E. Joyce (left), president, and M. J. Joyce (right), vice president, Joyce Bros. Storage & Van Co., Chicago, Ill., help their father, Michael J. Joyce, cut the cake as the firm celebrates its 50th year in the moving and storage business

TAG Headquarters

Headquarters for the Transport Air Group, recently organized association of Korean Airlift and Airfreight Carriers, are now functioning in Suite 720, Cafritz Building, 1625 Eye St., N.W., Washington 6, D.C.

—DA—

George T. Kindermann has been elected president of the Upper New York Warehousemen's Association.



Bekins Van & Storage Co. made one of its most historic hauls recently when a vanliner mercy-missioned Dr. Ross Winkler, 29, an iron lung-polio patient from Fresno, Calif. to Oakland's Highland Hospital

Pallet Dimensions

Two sizes were adopted as standard pallets for international trade at a recent nine-nation meeting in London. Under the auspices of the British Standards Institution, the group fixed 40 by 48 and 32 by 48 in. as standard pallet sizes. General construction specifications were agreed upon, but problems of common user and pallet return still have to be worked out.

—DA—

Customer Relations

F. L. O'Neill, general traffic manager of Minnesota Mining & Mfg. Co., and Needham B. Correll, traffic manager of R. J. Reynolds Tobacco Co., will address the annual spring meeting of the ATA Customer Relations Council, April 19-22, in Belleair, Fla.

The traffic men will take part in an "Industry on the Spot" session in which a panel of traffic managers will offer constructive criticism to the trucking industry. A free for all discussion by the audience and panel members will follow the opening remarks.

—DA—

Ray Thompson has been named 1953 president of the Iowa Industrial Traffic League. (Please Turn to Page 108)

MEN

IN THE NEWS

Materials Handling



A. E. Radcliffe, named sales manager by Mercury Manufacturing Co. Former assistant to the vice president in charge of sales, he has been with Mercury since 1947.

James Oliver—new district manager, Pacific Northwest, Hyster Co. Hyster also named Hollis Conner resident manager in the South Pacific; Robert Lange, East-Central district manager; Art Morris, North-Central district manager; Walt St. Clair, Mid-Central district manager; Robert Hille, Northwest central district manager.

Angus M. Brown—manager of commercial sales has taken on additional duties of manager, Billmyre Blower Division.

Michael Burtyk—named superintendent of Acme Steel Company's new Scarborough Works at Toronto.

Edward W. Addis—new automotive sales manager, Automatic Transportation Co.

Merritt S. Stevenson—new manager of Transportation Sales, Baker-Raulang Co.

H. J. Murray—new chief accountant of Hyster Co.

Bernhard G. Schneider—appointed to the newly created post of assistant chief engineer, Conveyor Equipment Section of Chain Belt's Conveyor and Process Equipment Div. Luther H. Bosnian—named vice-president in charge of manufacturing facilities. Lyman Newton—elected controller to succeed the late A. F. Kessler. F. D. Tinknell—named assistant treasurer.



James L. Ragland has been appointed manager of the new Rome, Ga. branch of the Fairbanks Co. He will supervise the entire Southern sales organization of the company.

Carleton P. Adams—named advertising manager, Yale & Towne Mfg. Co. Newcombe C. Baker, Jr.—new manager, special sales promotion.

G. A. Tamblin—appointed sales manager, Frank G. Hough Co.

W. H. Burkey—appointed district manager, Industrial Division, St. Louis area, Gould-National Batteries, Inc.

(Please Turn to Page 106)

HYSTER PRESENTS...

Two Completely NEW Lift Trucks!



30" Free Lift
75" Turning Radius
38" Wide
82½" Collapsed
Height (with 9' lift)



The Ultimate in 4000-lb.
Lift Truck Maneuverability

THE UC-30

Capacity, 3000 lbs.
(24" load center)
Length, only 74½"

THE YC-40

Capacity, 4000 lbs.
(at 24" load center)
Length, only 78¾"

STREAMLINED AND FUNCTIONALLY DESIGNED FOR UNEQUALED PERFORMANCE IN CAR LOADING, WARE- HOUSE AND ALL OTHER CLOSE-QUARTER OPERATIONS

Hyster now offers, in addition to the pneumatic-tired 4000-lb. YT-40 Lift Truck, a new lift truck in the 3000-4000-lb. class—*designed specifically for close-quarter operation!*

The new Hyster YC-40 is smaller than the pneumatic-tired YT-40 because it is *functionally* designed to more compact dimensions, utilizing smaller cushion tires. *The YC-40 is recommended for those applications*

where it is not necessary to use pneumatic tires.

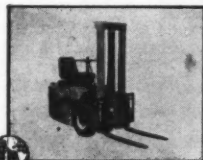
The new Hyster UC-30 is basically a YC-40 Lift Truck with a lighter counterweight, but with the same engine. Both incorporate advanced features not found in any other lift truck today! Call your Hyster dealer, or write for Catalog 1241 to:

HYSTER COMPANY

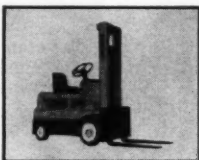
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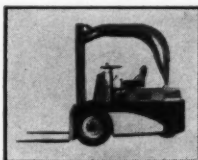
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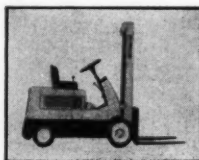
Hyster 20
for 1000-2000-lb. work
requiring pneumatic tires.



Hyster UC-30
for 3000-lb. close-quarter
work. Cushion tires.



Hyster YT-40
for 4000-lb. work requiring
pneumatic tires.



Hyster YC-40
for 4000-lb. work in close
quarters. Cushion tires.



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FOUR FACTORIES: Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands

Circle No. 7 on Card, Page 35, for more information



Washington **DA**

By Karl Rannells, *Chilton Washington News Bureau*

Distribution In Spotlight

It begins to look as if distribution is on the way to getting the attention it merits as a major factor in the nation's economic health. Wash-

ington is becoming more distribution conscious, is getting the idea that if bigger and better markets are sought, if efficient distribution is attained, high production and relative prosperity should follow.

Slated to become the key agency in putting this new policy into effect is the recently created Office of Distribution in the Commerce Department. Secretary Sinclair Weeks has assigned top priority to getting the 5-month-old office expanded. Look for an intensive program for helping all phases of distribution—including packaging and handling, shipping, and marketing.

Top management officials have been brought in without fanfare from various fields of distribution to help build the agency on a sound foundation. Their job is to smooth out kinks in the program, establish sound policies, and to get the program in high gear as quickly as possible.

Mr. Weeks had hurdled first obstacle—getting various fields of distribution to work together. Still ahead is job of pulling together, if possible, the scattered economic fact-finding groups under the new agency's roof. Main goal is simple—to find out and pass on to business the most modern, up-to-date information and advice on: marketing trends, expansion, creation, and development of markets, promotion of new requirements, and improvement of existing distribution and merchandising techniques.

Stockpiling Warehouses

Trend of storage program for government-held stockpile materials is moving more and more away from commercial warehousing and

toward use of government-owned space for those items to be held over long periods. General Services Administration has submitted special reports on the subject, detailing at great length the economies of government storage as opposed to commercial warehousing of such materials, most of which are placed in dead storage for indefinite periods.

Currently, GSA is still using more than 200 commercial locations for storage of materials ranging from silk and cordage fibers to oils and metal ores. Construction was recently completed of six new government warehouses, four of which have already been filled to capacity. Six new storage facilities are under construction, four of which are to be completed before the end of June. Surveys and specifications have been prepared for an additional two warehouses to be constructed as soon as the money is made available.

Transportation Coordination

A new attempt is being made by the Defense Department to iron out the kinks in its traffic problems. The job has been dropped

into the lap of the newly created Joint Land Transportation Agency, composed of military and civilian experts from all three military services and under direction of the Army.

Basic purpose to be accomplished by the agency is to plan and carry out better coordination and less duplication of common use military and commercial transportation facilities. This will apply to movement of traffic over land and through sea and aerial ports. A secondary purpose will be to set up a bug-free traffic control plan for reducing congestion of highway, rail, waterway, pipeline, and terminal facilities in the event of a national emergency.

Building Activity

Indications are that movement of materials and volume of work in the construction field will probably set a new record for 1953. Early

construction reports, covering Jan.-Feb. showed the two-month figure at \$4.5 billion, much less than the usual seasonal drop. February was also the 15th successive month that the construction figure exceeded the same month a year previous.

A quick run-down shows that construction work on warehouses and loft buildings, which have been hampered over the past two years by materials shortages and other reasons, were now going ahead at a steady rate during the winter months and at least one-third greater than last year. About \$100,000,000 worth of storage and office space went into place during January and February compared with about \$70,000,000 last year.

Highway Systems

Public works committees of the new Congress have had the usual scores of highway proposals dumped into their laps for study

and recommendation. These range from mere proposals for the government to spend more money on the highways to bills which would create new transcontinental highways. Chances are that most of them will never be sent to the floor of either house for a vote.

Among major proposals, Rep. Robert C. Wilson, a first term Republican from California, suggests building of connecting links between existing toll roads to form a superhighway from Massachusetts to California. A third term Democrat, Rep. Harley Staggers, has reintroduced his proposal which goes even

(Please Turn to Page 118)

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**Compare Trailer Values... You'll Find
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IF YOU ARE A HAULER, you can afford to be a "Fruehauf hauler." Fruehauf can fit your needs and your pocketbook exactly, and give you *best value* every time. Yes, when you consider the specifications you get with any Fruehauf, it's actually the *lowest-priced* Trailer to be had!

Every one of the five Fruehauf van types is offered in a Standard, a De Luxe, and a Super De Luxe model. That gives you an additional price range—the widest there is. But *every* Fruehauf has all the basic, necessary specifications you need for consistent, profitable hauling. Many of these features, like the tire-saving Gravity Tandem, with the only *complete* tandem guarantee in the industry, can't be matched anywhere else, at any price!

So be sure, when you compare Trailer prices, to compare specifications, and values. You'll find the "specs" you get always make Fruehauf your best buy!

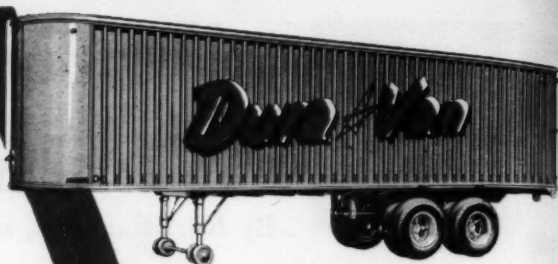
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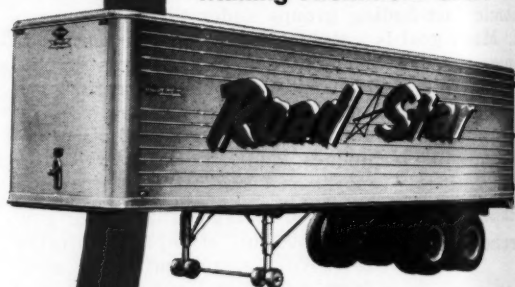
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**For Combined Appearance
and Serviceability!**



**For Heaviest Duty in a Money-
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Strength, Lightest Weight, Lowest
Maintenance Cost!**

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AWA to Convene

May 17 in Washington

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Capital — refrigerated and merchandise divisions plan
full business and social programs for members and guests**

FINAL plans are rounding into shape for the 62nd Annual Meeting of the American Warehousemen's Association. The meeting this year is scheduled for May 17 to 21 at the Shoreham Hotel, Washington, D. C.

J. L. Gagini, general president of the AWA, has predicted that the 1953 gathering will be an exceptional one in every respect. An outstanding business program is in the mill, the social program promises to be one of the fullest ever and, in addition, members and their guests will be given an opportunity to see and discuss their government in action under a new administration.

Meeting jointly will be the National Association of Refrigerated Warehouses, a division of AWA, and the AWA Merchandise Division. A. B. Efroymsen, of Cleveland, Ohio, national president of the NARW, will preside over the program of his group. I. S. Culver, of San Francisco, Cal., will chair Merchandise sessions in his capacity as president of the Merchandise Division. Mr. Gagini, Omaha, Neb., will preside over the general meeting.

The NARW will conduct all panel sessions, "assuring a grass roots approach to all problems affecting the refrigerated ware-



J. L. Gagini
AWA President

house industry." Roger Fleming, secretary-treasurer of the American Farm Bureau Federation, will address the NARW group on Wednesday, May 20.

Although details of the Merchandise Division program have not yet been completed, the general theme will lean toward economy in warehousing, with an abundance of special speakers and discussions on the docket.

Representative Walter Judd, Minnesota Republican, is scheduled to address the group at the closing luncheon, Thursday, May 21. Noted for his oratory, Representative Judd is considered a leading expert on foreign affairs.

Other speakers and additional program details will be announced later in special bulletins to AWA

members. Mr. Gagini has announced that the President's Reception and 62nd Annual Dinner will be conducted at the Statler Hotel Wednesday evening, May 20.

Registration for the actual convention will begin on Saturday and continue through Sunday. The first business session is listed for Monday morning. The Convention Committee is outlining special weekend activities for those who will arrive early.

One of those special events, for which the AWA office is securing tickets, is the world famous Eastern Sprint Champion Regatta.

Those expecting to attend the convention are urged to make reservations early. Convention and hotel registration is being handled by the AWA staff. Details can be obtained by writing AWA, 608 Tower Building, Washington 5, D. C.

In addition to the AWA agenda, it is expected that several of the larger warehouse service organizations will conduct their annual meetings in conjunction with the main program. Such groups as Associated Warehouses, Inc., Distribution Service, Inc., Allied Distribution, Inc., American Chain of Warehouses and Interlake Terminals customarily meet at this time. •

DA Previews

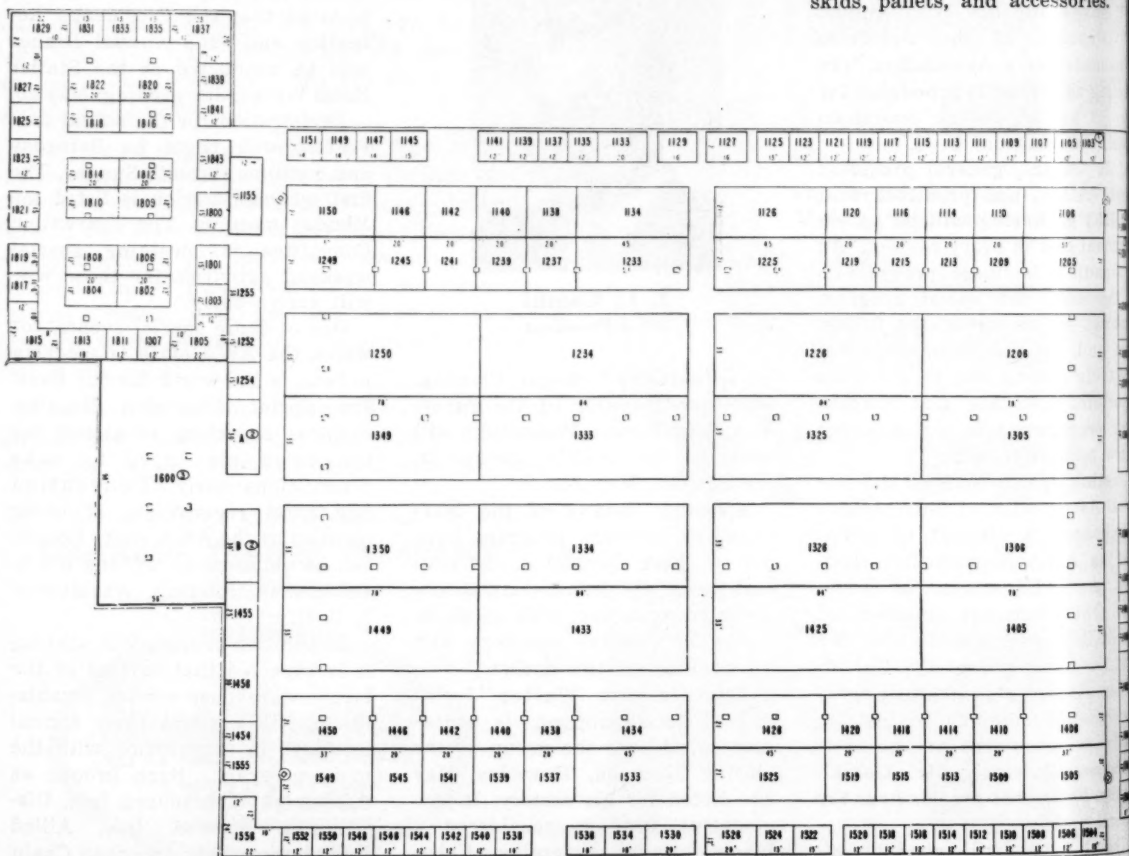
New developments in handling

the 5th

NATIONAL MATERIALS HANDLING EXPOSITION

MORE than 25,000 visitors from 40 countries are expected to attend the Fifth National Materials Handling Exposition, which will be held at the Convention Hall, Philadelphia, May 18 to 22.

Thousands of new models of materials handling equipment valued at more than \$10,000,000 will be displayed by 300 industrial equipment manufacturers and allied groups. Machines will include lift and fork trucks, both gasoline and battery powered, conveyors, both portable and permanent, hoists, monorails, cranes, tractors, trailers, hand trucks, stacking units, portable elevators, skids, pallets, and accessories.



EXHIBITION HALL

equipment and techniques at Phila. Show, May 18-22

The exposition, which will be the largest capital goods industrial show to be held anywhere in the country during 1953 and the largest ever held in Philadelphia, will have 3,000 experts on hand to answer visitors' questions, according to Clapp & Poliak, Inc., show managers.

Shown below is the floor plan of the Philadelphia Convention Hall, giving the location of each exhibitor's booth. Entrance to the main arena is at the upper right hand corner of the floor plan here and proceeds from right to left.

Sponsored by the Materials Handling Institute, organization of handling equipment manufacturers, admission to the exposition

is by registration only. The show will not be open to the general public. There is no registration fee, however, advance registration will save visitors much time and annoyance.

A group of 42 speakers, representing many of the outstanding industries in the country, will head workshop seminars at the Materials Handling Conference which will be held concurrently with the exposition. The following five aspects of materials handling will be the subject of a seminar on three of the five days of the show from 9 a.m. to noon:

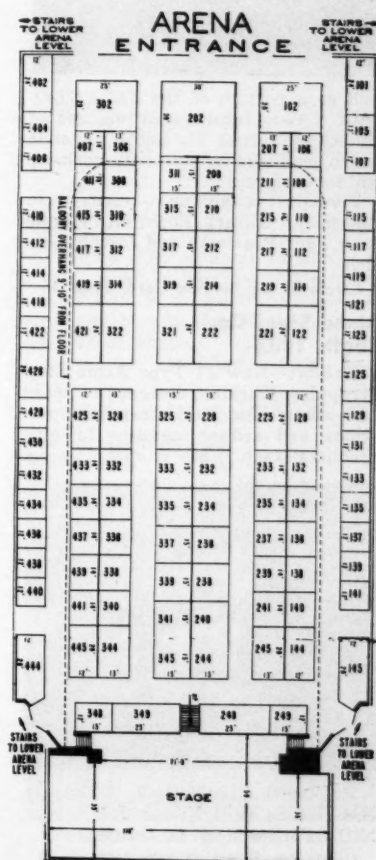
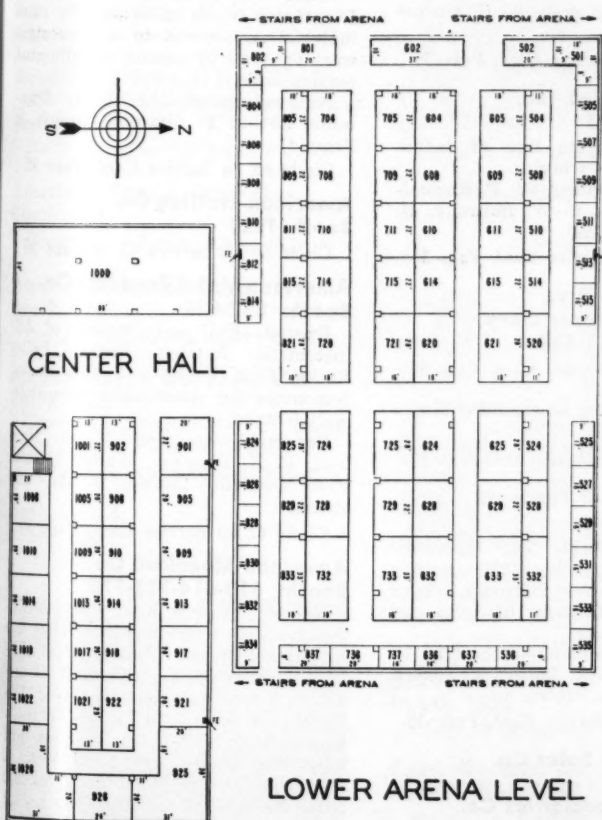
- Handling in Process
- Warehousing and Shipping

- Packaging for Improved Handling
- Bulk Handling
- Requirements for Organization, Study and Analysis

The American Materials Handling Society, an organization composed of users of handling equipment, is conducting the conference. The sessions will permit each visitor to spend nine hours in a workshop discussion of a single aspect of his work, or three hours on each of three subjects. The morning hours have been set aside so that visitors will be able to attend the exposition opened daily from 10:30 a.m. to 5:30 p.m.

A registration fee of \$15 for the Conference Sessions will include a transcript of the proceedings. For conference registration cards, address American Materials Handling Society, Inc., 1953 Technical Sessions Registration Committee, P. O. Box 354, Philadelphia 5, Pa.

(Please Turn Page)



DA Previews the Fifth National Materials Handling

For your convenience a list of exhibitors, the type of display planned, names of personnel attending and a photograph of their standard or newest product is shown below. Additional information on each exhibitor may be secured by circling the key number on Reader Service Card on Page 35 in this issue.

Acme Pallet Co., Inc. Booth 1149

Exhibit—SELECT-O-MAT, a new method of handling cases for filling orders and order picking, which would apply to wholesale grocers, super market warehouses, drug warehouses, and various types of storekeeping departments of manufacturing plants. A motion picture film will be shown as



well as a portion of the SELECT-O-MAT. Also, several new designs of pallets for longer life and a pallet in which nail heads will not work up will be exhibited.

Personnel attending — Alfred R. Glassman, Gilbert Robinson, Harold Ross, Jack Pearlman and Joseph Kanrich.

Circle 51 on Service Card, Page 35

Acme Steel Co. Booth 1002

Exhibit—New F1 Type Acme Steel Strapping Machine, designed to speed high-volume flat steel strapping operations and reduce operator fatigue, produces strap joints by spot welding.



Personnel attending—J. G. Bucuss, E. C. Evans, C. E. Klinck, J. H. Prout, N. E. Fork and H. D. Connell.

Circle 52 on Service Card, Page 35

Aerol Co., Inc. Booths 1522-1524

Circle 53 on Service Card, Page 35

Aeroquip Corp. Booth 1129

Circle 54 on Service Card, Page 35

Ainsworth Mfg. Corp. Booths 1818-1822

Exhibit—First showing of a new steel framing material called MULT-A-FRAME, which consists of three basic units—Channel Frames, Spring-



T-Bolts, and Safe-Locking Fittings. This new framing can be dismantled, adapted, or converted without scrapping to meet new and different uses.

Personnel attending—M. M. Roberts, W. D. Walton, W. C. Wernet and R. R. Irwin.

Circle 55 on Service Card, Page 35

Albion Industries, Inc. Booths 315-317

Exhibit—Complete line of industrial casters and wheels.

Personnel attending—J. F. Karmalski, R. B. Davis, C. W. Burns, J. H. Hart, R. W. Broas.

Circle 56 on Service Card, Page 35

Alemite Sales Div., Stewart-Warner Corp. Booths 529-531-533

Circle 57 on Service Card, Page 35

Algene Marking Equipment Co. Booth 212

Circle 58 on Service Card, Page 35

Allen Industrial Products Booth 1810

Exhibit — Series "34," Hydraulic shovel for lifttrucks, "23" Gravity Dump Shovel for lifttrucks, Snow Plow Model 6083-52 for lifttrucks, and Cabs for lifttrucks.

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Circle 59 on Service Card, Page 35

Allied Mfg. & Sales Co. Booth 101 See Grand Specialties Co.

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Personnel attending—A. L. Anderson, P. E. Kahle and Harry Bates.

Circle 61 on Service Card, Page 35

All Steel Welded Truck Co. Booths 106-108-207-211

Circle 62 on Service Card, Page 35

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Personnel attending—W. K. Stokes, Jose Almeida, and N. M. Sullivan.

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Personnel attending—J. J. Cranmore, Arthur P. Simpson, Joseph A. Schmid.

Circle 65 on Service Card, Page 35

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Exhibit—Full scale models of Automatic Ratchet Racks, Pallet Racks, Skid Racks and Die Racks, demonstrating American's "No Bolt-ing" feature.

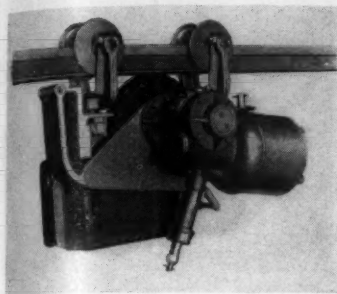
Personnel attending—M. D. Harwell, R. K. Degener, Walter Nelson, Fred Gutman, Charles Boutz, and others.

Circle 67 on Service Card, Page 35

American MonoRail Co. Booths 610-614-711-715

Exhibit—A new light duty MonoTractor with 1 ton capacity. Also, the Automatic Dispatch Carrier, No. MV-221 RailMaster MonoTractor Crane with a 3-ton Yale Hoist and No. MV-22 MonoTractor, No. MBH-30 RailMaster Glide Switch, No. 555 Standard Electrified Crane with 1-ton R & M "J" type Electric Hoist and No. 296 Glide Switch will be used for actual industrial operations.

Exposition



Personnel attending—J. P. Lawrence, J. L. Pischke, A. S. Wroblewski, E. H. Doerger, F. L. Bateman, W. A. Bayes, C. L. Fell, T. W. Winters, A. Crofcheck, Thos. E. Newby, A. Gordon Davis, Winthrop Davis, H. B. Brown, J. J. Rambo, E. L. Seward, T. Spencer Williamson, M. S. Smith.

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American Tractor Corp. Booth 926

Circle 72 on Service Card, Page 35

Anchor Steel & Conveyor Co. Booth 532

Personnel attending—H. Beebe, Bruce Preble, Henry J. Beam.

Circle 73 on Service Card, Page 35

Anthony Co. Booth 620

Exhibit—Anthony Lift Gate



Personnel attending—Edward Belows, Frank Novotney, Mark Anthony, Howard Campbell.

Circle 74 on Service Card, Page 35

Arrow Products, Inc. Booth 444

Circle 75 on Service Card, Page 35

Austin-Western Co. Booths 1142-1146

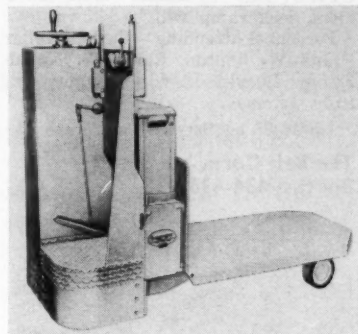
Exhibit—Action photos of the Austin-Western Hydraulic Crane.

Personnel attending—Ralph K. Stiles, J. R. Maulcook, Herbert Hesse, D. J. Phillips, H. F. Barrows, R. H. Diller, and Frank Pilmer.

Circle 76 on Service Card, Page 35

Automatic Transportation Co. Booths 1308, 1405

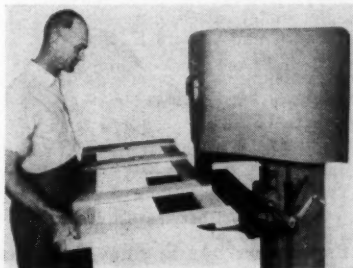
Personnel attending—J. A. Bal-dinger, R. A. Dusseau, F. W. Lamb, R. M. Whitney, J. M. Johnson, Fenton Hall, C. H. Greener, J. L. Van Cara, B. I. Uliniski, A. C. Elley, H. J. Hincker, H. J. Framhein, B. M. Kewin.



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Personnel attending—William H. Wilkerson, Joe H. Howell, G. Mack Wynn, L. K. Guymon, Bob Tyler.

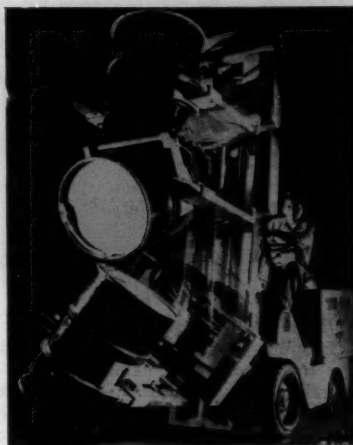
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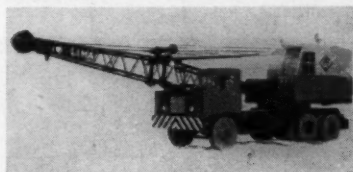


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Circle 80 on Service Card, Page 35

Baldwin-Lima-Hamilton Corp. Booth 144



Exhibit—Photographic display of Lima machines handling material in conjunction with Austin-Western in adjoining booths, including new Lima 44-T truck crane.

Personnel attending—Jack Hardesty.

Circle 81 on Service Card, Page 35

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Exhibit—Model 362, Portable Conveyor.



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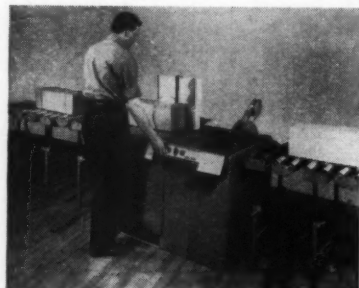
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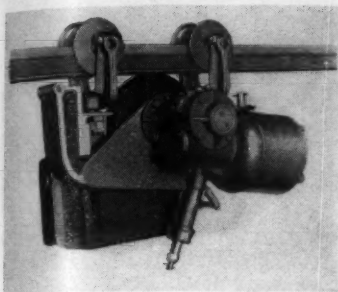
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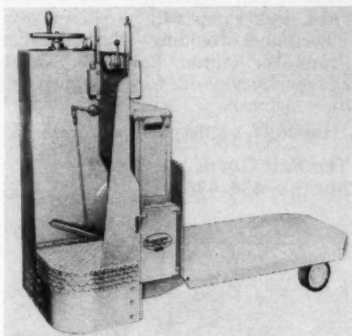
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Circle 76 on Service Card, Page 35

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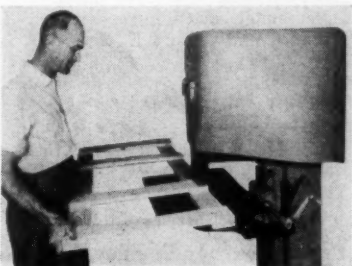
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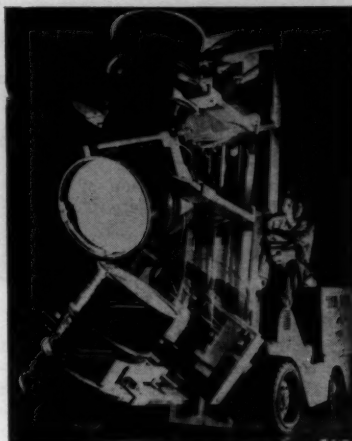
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Personnel attending—Jack Hardesty.

Circle 81 on Service Card, Page 35

Barber-Greene Co. Booth 602

Exhibit—Model 362, Portable Conveyor.



Circle 82 on Service Card, Page 35
(Please Turn Page)

... Handling Exposition

(Continued from Preceding Page)

The Ballymore Co. Booth 140

Exhibit—Demonstration of various models Ballymore Safety Step Ladders.

Circle 83 on Service Card, Page 35

Barrett-Cravens Co. Booths 1350-1449

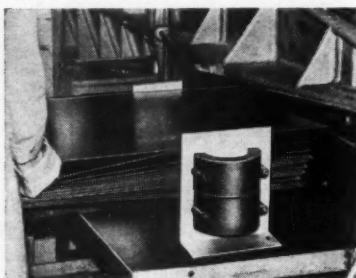
Exhibit—Entire line of equipment for the "floor-level" handling of materials: hand lift trucks, electric lift trucks and tractors; Crescent electric trucks and tractors; steeleg skids; portable elevators, steel storage racks; handling specialties. Various models will be shown in actual operation.

Personnel attending—A. M. Barrett, A. M. Barrett, Jr., O. M. Lund, C. E. Barnes, and H. C. Fernstrom.

Circle 84 on Service Card, Page 35

The Basco Mfg. Co. Booth 1833

Exhibit—Automatic Steel Separators consisting of a permanent magnet that induces a magnetic field in the stacked sheets which tend to repel each other causing the ends of the sheets to fan out with air space between them. No matter what substance appears on the steel or amount of grease covering, they cannot stick together.



Personnel attending — William L. Brown, Fred W. Stuart, Robert Hammeal, Robert Mikula, E. G. Regan and Clark Hopkins.

Circle 85 on Service Card, Page 35

The Bassick Co. Booth 906

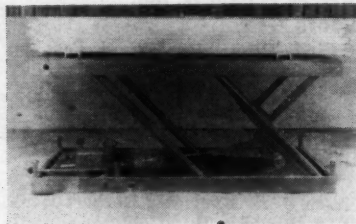
Exhibit—Complete line of industrial casters, wheels, and position locks. Special emphasis will be placed on recent developments of the "Floating-Hub" shock absorbing casters.

Personnel attending—A. J. Israel, W. G. Reycroft, Michael Kramcsak, J. B. Funk, Jr., F. O. Johnson, and C. W. Bontems.

Circle 86 on Service Card, Page 35

Beacon Machinery, Inc. Booth 815

Exhibit—Two new products will be

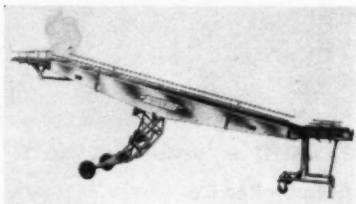


revealed: Beacon automatic pallet dispenser and stacker, capable of feeding pallets on demand from an operator at a pallet-loading point, or to accept and stack a pallet, returning it to the pallet magazine as pallets are fed to the unit. Also, a hydraulic lift table, made in two capacities, 4,000 and 10,000 lb, completely self-contained, including electric motor and pump unit. Model HPK-3 full hydraulic multi-movement dock ramp will be shown.

Personnel attending—Earl C. Keller, Frank W. Fenton, Ralph W. Kalish, E. A. Lucyk, Lloyd Skougor, and Billy Johnson.

Circle 87 on Service Card, Page 35

The Belt Corp. Booths 434-436-438



Exhibit—Model "R" and "TL" VER-SAVEYOR, Model "S" and "U" Handy-Handler conveyor units.

Personnel attending—Richard L. Kennard and Robert E. Slyh.

Circle 88 on Service Card, Page 35

Benbow Mfg. Co. Booth 1500

Exhibit—Trolley busways: Insul-Bar, Track Trolley—Walking Type, Track Trolley—Sliding Type.

Circle 89 on Service Card, Page 35

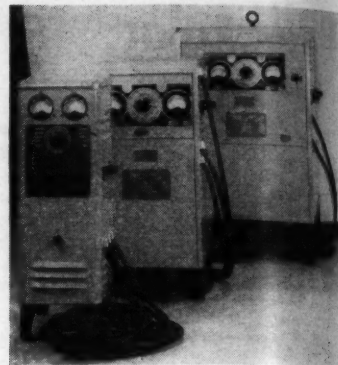
Benton Harbor Engineering Wks. Booth 1807

Circle 90 on Service Card, Page 35

Berg-Gibson Mfg. Co. Booths 439-441

Exhibit—Complete line of industrial truck battery charging equipment, featuring one operating unit made entirely of transparent plexiglass and other battery chargers for automotive, industrial, railway, marine and specialized types of service.

Personnel attending — Charles B. Berg, Walter Haas, G. W. Gibson,



Walter Benus, B. W. Wendt and several others.

Circle 91 on Service Card, Page 35

Better Packages, Inc. Booth 502

Exhibit—Complete line of sealing machines for all kinds of gummed and pressure sensitive tapes. Envelope and Label Moisteners will be included, in addition to the regular Shipping Room and Special Industrial Models.

Personnel attending—M. W. Waggoner, O. K. Hill, L. James, R. Chilton, I. DeBlayker, N. Campanaro, and J. Murphy.

Circle 92 on Service Card, Page 35

Big Joe Mfg. Co. Booth 1434

Exhibit—Several new models of hydraulic lift trucks including remote control devices.

Personnel attending—Jack Kiefus, Harry Levine, Joseph Custer, Joseph Kiefus, John O. Sadler, Ralph Webster, Fred Hill, and Nook & O'Neil.

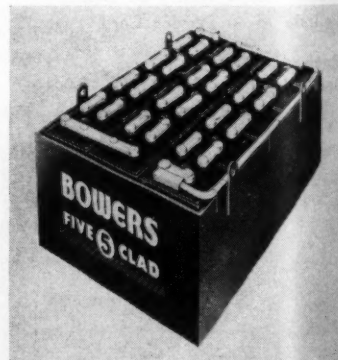
Circle 93 on Service Card, Page 35

Bond Foundry and Machine Co. Booth 805

Circle 94 on Service Card, Page 35

Bowers Battery & Spark Plug Booth 1023

Exhibit — Featuring new battery with five-clad insulation that provides positive plate with longer life plus an active material for greater efficiency and power.



(Please Turn to Page 40)



350 Exhibitors At AMA Packaging Show



F. L. Triggs
Exhibit Chairman



J. A. Warren
*Conference
Chairman*

22nd National Exposition and companion Packaging Conference is expected to attract 25,000 visitors as registrations pour in for April 20-23 Chicago date

its companion event, AMA's National Packaging Conference, will be the principal features of Packaging Week.

The Exposition will require both wings of Chicago's Navy Pier to house an anticipated record 350 exhibitors of machinery, equipment, materials and services. More than 1,500 packaging executives and technicians are expected to attend the conference sessions, April 20-22, also on the Navy Pier.

On Monday and Wednesday the exhibit hall will be open from 10 am to 6 pm, on Tuesday from 10 to 10, and on Thursday from 10 am to 3 pm. There will be no admission charge, but visitors are advised to register in advance in order to avoid a registration wait when the doors open.

The packaging conference opens on Monday, but closes on Wednesday, a day earlier than the show. The conference will feature a great-

er number of technical presentations than at any previous show, several panel discussions and a completely new workshop exhibit.

EXHIBITOR

BOOTH

—A—

A-B-C Packaging Machine Corp.	135, 136
Acme Steel Co.	416, 417
Addressograph-Multigraph Corp.	185
Ajusto Equipment Co.	868
Alemite Division, Stewart-Warner Corporation	174, 175
Algine Marking Equipment Co.	256
W. F. Altenpohl, Inc.	184
Aluminum Co. of America	525
Aluminum Foils, Inc.	672
American Can Co.	427
American Cellulose Corp.	671
American Coating Mills Corp.	827
American Cyanamid Co.	851, 852
American Excelsior Corp.	354, 355
American Instrument Co.	588
American Marking Corp.	464
American Partition Co., Div. of Clinton Foods, Inc.	549
American Type Founders, Inc.	577
Amsco Packaging Machinery	119
Arabol Manufacturing Co.	649, 749
Arenco Machine Co., Inc.	820
Armour and Co., Curled Hair Div.	572
Arvey Corp.	536
Askania Regulator Co.	267, 268
Associated Cooperage Industries	344
Atlantic Gummed Paper Corp.	245, 246
Atlas Plywood Corp.	156, 157
Automatic Web Control Mfg. Co.	675
Avery Adhesive Label Corp.	254, 255

(Please Turn to Page 98)

SOME 25,000 business executives, representing 48 states and 30 countries, are expected at the American Management Association's 22nd National Packaging Exposition in Chicago, April 20-23. The four-day show, together with



SPECIFICATIONS

LIFT TYPE—Pallet,

Shown below and on the following pages is, to the best of our knowledge, the first listing in any publication in our field of the essential specifications of Industrial Lift-Type Trucks. Due to space limitations basic models only are presented

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY		Service Weight (Lb.) (Unloaded but including battery)	Operation Type	Power Type	Lift Type	MAST		OVERALL DIMENSIONS (In.)										TURNING RADIUS (In.)		
		Weight (Lb.)	Load Center (In.)					Extending?	Tilt		Length		Height		Width	Free Lift	Max. Lift Elevation	Lowest Underclearance	With Platform or Forks	Turns in Intersecting Aisle	Minimum Aisle for Right Angle Stacking	Three or Four Point Suspension
									Forward (Deg.)	Rearward (Deg.)	With Platform or Forks	Without Platform or Forks	With Mast Extended	No Extension Mast								
1	Atlas	3EA17	6000	27	4400	R	E-G	Ptf	N			122		50	40 1/2	6	17	3 1/2	86	67		
2		3EA82	6000		5200	R	E-G	Ptf	N			16	104	82	40 1/2		62	3 1/2	81	61		
3	Buda	FB20-15	2000	15	3514	R	G	Fk	Y	3	10	92 1/2	62 1/2	142 1/2	83	32	12	120	7	58 1/2	53 1/2	74 1/2
4		FB20-15	2000	15	4114	R	G	Fk	Y	3	10	96 1/2	66 1/2	142 1/2	83	35	12	120	8 1/4	67	56 1/2	82 1/2
5		FB20-24	2000	24	4129	R	G	Fk	Y	3	10	92 1/2	62 1/2	142 1/2	83	32	12	120	7	58 1/2	53 1/2	74 1/2
6		FB20-24	2000	24	4129	R	G	Fk	Y	3	10	96 1/2	66 1/2	142 1/2	83	35	12	120	8 1/4	67	56 1/2	82 1/2
7		FT30-15	3000	15	4980	R	G	Fk	Y	5	10	103 1/2	73 1/2	146	83	38	12	120	5 1/2	60	60 1/2	81 1/2
8		FTD30-15	3000	15	5070	R	D	Fk	Y	5	10	103 1/2	73 1/2	146	83	38	12	120	5 1/2	60	60 1/2	81 1/2
9		FT30-24	3000	24	5868	R	G	Fk	Y	5	10	112 1/2	76 1/2	146	83	38	12	120	5 1/2	65	63 1/2	84 1/2
10		FTD30-24	3000	24	5958	R	D	Fk	Y	5	10	112 1/2	76 1/2	146	83	38	12	120	5 1/2	65	63 1/2	84 1/2
11		FT40-18	4000	18	6038	R	G	Fk	Y	5	10	112 1/2	76 1/2	146	83	38	12	120	5 1/2	65	63 1/2	84 1/2
12		FTD40-18	4000	18	6128	R	D	Fk	Y	5	10	112 1/2	76 1/2	146	83	38	12	120	5 1/2	65	63 1/2	84 1/2
13		FT40-24	4000	24	6378	R	G	Fk	Y	5	10	117 1/2	81 1/2	146	83	38	12	120	5 1/2	65 1/2	65 1/2	89 1/2
14		FTD40-24	4000	24	6468	R	D	Fk	Y	5	10	117 1/2	81 1/2	146	83	38	12	120	5 1/2	65 1/2	65 1/2	89 1/2
15		FT50-24	5000	24	7840	R	G	Fk	Y	5	10	88	152 1/2	83	42	6	120	6 1/4	84	71	96 1/2	
16		FTD50-24	5000	24	7960	R	D	Fk	Y	5	10	88	152 1/2	83	42	6	120	6 1/4	84	71	96 1/2	
17		FT60-24	6000	24	9000	R	G	Fk	Y	5	10	93	152 1/2	83	42	6	120	6 1/4	91 1/2	74 1/2	102 1/2	
18		FTD60-24	6000	24	9150	R	D	Fk	Y	5	10	93	152 1/2	83	42	6	120	6 1/4	91 1/2	74 1/2	102 1/2	
19	Clark	1024	1000	24	2505	R	G	Fk	Y	5	10	86 1/2	55 1/2	103	61	28	6 1/4	84	2 1/2	57	49	67 1/2
20		1024	1000	24		R	G	Fk	Y	3	10	86 1/2	55 1/2	147	83	28	6 1/4	128	2 1/2	57	49	67 1/2
21		2024	2000	24		R	G	Fk	Y	5	10	98 1/2	67 1/2	90 1/2	57	32 1/4	6 1/4	72	3	65	56	77 1/2
22		2024	2000	24	4300	R	G	Fk	Y	3	10	98 1/2	67 1/2	142 1/2	83	32 1/4	6 1/4	124	3	65	56	77 1/2
23		2024	2000	24		R	G	Fk	Y	3	10	98 1/2	67 1/2	150 1/2	87	32 1/4	6 1/4	132	3	65	56	77 1/2
24		2024	2000	24		R	G	Fk	Y	3	10	103 1/2	72 1/2	93	60	34 1/2	6 1/2	72	5	71 1/2	59	85 1/2
25		2024	2000	24	4000	R	G	Fk	Y	3	10	103 1/2	72 1/2	139	83	34 1/2	6 1/2	118	5	71 1/2	59	85 1/2
26		3024	3000	24		R	G	Fk	Y	5	10	110 1/2	73 1/2	93 1/2	59	38	6 1/2	72	2 1/2	71 1/2	65	96 1/2
27		3024	3000	24	6500	R	G	Fk	Y	3	10	110 1/2	73 1/2	141 1/2	83	38	6 1/2	120	2 1/2	71 1/2	65	96 1/2
28		3024	3000	24		R	G	Fk	Y	3	10	110 1/2	73 1/2	165 1/2	96	38	6 1/2	144	2 1/2	71 1/2	65	96 1/2
29		4024	4000	24		R	G	Fk	Y	5	10	118	80 1/2	93 1/2	59	38	6 1/2	72	2 1/2	78	68	92 1/2
30		4024	4000	24	6990	R	G	Fk	Y	3	10	118	80 1/2	141 1/2	83	38	6 1/2	120	2 1/2	78	68	92 1/2
31		4024	4000	24		R	G	Fk	Y	3	10	118	80 1/2	165 1/2	96	38	6 1/2	144	2 1/2	78	68	92 1/2
32		5024	5000	24		R	G	Fk	Y	5	10	121	83 1/2	93 1/2	59	39	6 1/2	72	2 1/2	81 1/2	70	96 1/2
33		5024	5000	24	7770	R	G	Fk	Y	3	10	121	83 1/2	141 1/2	83	39	6 1/2	120	2 1/2	81 1/2	70	96 1/2
34		5024	5000	24		R	G	Fk	Y	3	10	121	83 1/2	165 1/2	96	39	6 1/2	144	2 1/2	81 1/2	70	96 1/2
35		6024	6000	24		R	G	Fk	Y	3	10	131 1/2	94 1/2	142 1/2	85 1/2	41 1/2	6 1/2	120	5	85 1/2	73	103 1/2
36		6024	6000	24	6570	R	G	Fk	Y	3	10	131 1/2	94 1/2	142 1/2	85 1/2	41 1/2	6 1/2	120	5	85 1/2	73	103 1/2
37		6024	6000	24	9750	R	G	Fk	Y	3	10	132	88	141 1/2	83	44	25	118	2 1/2	85	74 1/2	100 1/2
38		6024	6000	24		R	G	Fk	Y	3	10	132	88	167 1/2	97	44	25	144	2 1/2	85	74 1/2	100 1/2
39		7024	7000	24	10450	R	G	Fk	Y	3	10	133 1/2	89 1/2	141 1/2	83	44	25	118	2 1/2	86	75 1/2	101 1/2
40		7024	7000	24		R	G	Fk	Y	3	10	133 1/2	89 1/2	167 1/2	97	44	25	144	2 1/2	86	75 1/2	101 1/2
41		8024	8000	24		R	G	Fk	Y	3	10	185	111	98 1/2	65	68	6 1/2	72	4 1/2	114	94	134 1/2
42		8024	8000	24	9870	R	G	Fk	Y	3	10	185	111	138 1/2	85	68	6 1/2	112	4 1/2	114	94	134 1/2
43		8024	8000	24		R	G	Fk	Y	3	10	185	111	170 1/2	102	68	6 1/2	144	4 1/2	114	94	134 1/2
44		100	10000	24	12860	R	G	Fk	Y	3	10	152	108	128 1/2	83	50 1/2	7	98	2 1/2	105	87 1/2	122 1/2
45		100	10000	24		R	G	Fk	Y	4	12	183 1/2	135 1/2	118	81	78 1/2	15	84	7 1/2	135 1/2	113	158 1/2
46		100	10000	24		R	G	Fk	Y	4	12	183 1/2	135 1/2	178	113	78 1/2	15	144	7 1/2	135 1/2	113	158 1/2
47		100	10000	24		R	G	Fk	Y	4	12	183 1/2	135 1/2	244	150	78 1/2	15	210	7 1/2	135 1/2	113	158 1/2
48		150	15000	24		R	G	Fk	Y	4	12	221	170 1/2	129 1/2	89	94 1/2		84	6 1/2	165	136	192 1/2
49		150	15000	24		R	G	Fk	Y	4	12	221	170 1/2	165 1/2	107	94 1/2		120	6 1/2	165	136	192 1/2
50		150	15000	24		R	G	Fk	Y	4	12	221	170 1/2	177 1/2	113	94 1/2		132	6 1/2	165	136	192 1/2
51		150	15000	24		R	G	Fk	Y	4	12	221	170 1/2	225 1/2	137	94 1/2		180	6 1/2	165	136	192 1/2
52		150	15000	24	18330	R	G	Fk	Y	4	12	221	170 1/2	255 1/2	182	94 1/2		210	6 1/2	165	136	192 1/2
53		1024	1000	24	2460	R	E	Fk	Y	5	10	84 1/2	53 1/2	103	61	28	6 1/4	84	2 1/2	58	51 1/2	68 1/2
54		1024	1000	24		R	E	Fk	Y	3	10	84 1/2	53 1/2	147	83	28 1/2	6 1/4	128	2 1/2	58	51 1/2	68 1/2
55		2024	2000	24		R	E-G	Fk	Y	5	10	94 1/2	63 1/2	90 1/2	57	34 1/2	6 1/2	72	2 1/2	61 1/2	57	73 1/2
56		2024	2000	24	4950	R	E-G	Fk	Y	3	10	94 1/2	63 1/2	142 1/2	83	34 1/2	6 1/2	124	2 1/2	61 1/2	57	73 1/2
57		2024	2000	24		R	E-G	Fk	Y	3	10	94 1/2	63 1/2	150 1/2	87	34 1/2	6 1/2	132	2 1/2	61 1/2	57	73 1/2
58		3024	3000	24		R	E-G	Fk	Y	5	10	110 1/2	73 1/2	93 1/2	59	34 1/2	6 1/2	72	2 1/2	69	63 1/2	83 1/2
59		3024	3000	24	6735	R	E-G	Fk	Y	3	10	110 1/2	73 1/2	141 1/2	83	34 1/2	6 1/2	120	2 1/2	69	63 1/2	83 1/2
60		3024	3000	24																		

NS -Industrial Trucks

Platform and Fork

for each of the twenty-six companies represented. A multitude of variations, to fit the needs of the individual user of this type of equipment, are available from any one or all of the manufacturers listed in this table.

PLATFORM OR FORK DIMENSIONS (In.)					ENGINE OR MOTOR		BATTERY		TRANSMISSION		TRUCK SPEED								GRADE-ABILITY (Per Cent)		Dead Man Brake?	Line Number
Standard Length	Standard Width	Height of Back	Height from Ground When Lowered	Lateral Adjustment of Forks	Make and Model	Horsepower	Normal Voltage	Ampere Hours	No. of Forward Speeds	No. of Reverse Speeds	Unloaded				Capacity Load				Unloaded	Capacity Load		
											Forward (mph)	Reverse (mph)	Lifting (fpm)	Lowering (fpm)	Forward (mph)	Reverse (mph)	Lifting (fpm)	Lowering (fpm)				
34	27	6	11		Atlas 1175	5	30	306	3	3	6 1/4	6 1/4	180	180	4 1/4	4 1/4	120	120	30	20	Y	1
34	27	16	11		Atlas 1175	5	30	306	3	3	6	6	22	22	4 1/4	4 1/4	12	12	30	20	Y	2
30	4	21 1/4	22 3/4	14 1/4-30	Wau. ICK-135-B	18			2	2	7	7			7	7	44		18.4		N	3
30	4	21 1/4	22 3/4	14 1/4-30	Wau. ICK-135-B	18			2	2	8 1/2	8 1/2			8 1/2	8 1/2	44		18		N	4
30	4	21 1/4	22 3/4	14 1/4-30	Wau. ICK-135-B	18			2	2	7	7			7	7	44		16.9		N	5
30	4	21 1/4	22 3/4	14 1/4-33	Wau. ICK-135-B	18			2	2	8 1/2	8 1/2			8 1/2	8 1/2	44		14		N	6
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45		30		N	7
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45		30		N	8
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45		30		N	9
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45		30		N	10
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45		30		N	11
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	12
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	13
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	14
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	15
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	16
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	17
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	18
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	19
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	20
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	21
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	22
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	23
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	24
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	25
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	26
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	27
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	28
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	29
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	30
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	31
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	32
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	33
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	34
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	35
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	36
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	37
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	38
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	39
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	40
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	41
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	42
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	43
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	44
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	45
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	46
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	47
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	48
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	49
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	50
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	51
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	52
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	53
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	54
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	55
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	56
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	57
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	58
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	59
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		N	60
30	4	24 3/4	26 1/4	16-35	Buda. 4B-153	49			2	2	8 1/2	8 1/2			8 1/2	8 1/2	45	Var	30		</	

DA SPECIFICATIONS

LIFT TYPE—Pallet,

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY		Service Weight (Lb.) (Unloaded but including battery)	Operation Type	Power Type	Lift Type	MAST		OVERALL DIMENSIONS (In.)										TURNING RADIUS (In.)			
		Weight (Lb.)	Load Center (In.)					Extending?	Tilt		Length		Height		Width	Free Lift	Max. Lift Elevation	Lowest Underclearance	With Platform or Forks	Turns in Intersecting Aisle	Minimum Aisle for Right Angle Stacking	Three or Four Point Suspension	
									Forward (Deg.)	Rearward (Deg.)	With Platform or Forks	Without Platform or Forks	With Mast Extended	No Extension Mast									
1	Crescent—Continued																						
2	JEH-1	1000	24	4400	R	E	Fk	Y	3	5	83	53	137	83	33	66	120	3	48	49	59*	3	
3	JEH-2-18	2000	18	5475	R	E	Fk	Y	3	5	91½	55½	137	83	33	66	120	3	50	52	61½	3	
4	JEH-2-24	2000	24	5800	R	E	Fk	Y	3	5	93½	55½	137	83	33	66	120	3	52	53	63½	3	
5	JEH-3	3000	24	7850	R	E	Fk	Y	3	3	100½	74½	152	83	38½	64½	130	4	58	58	71½	4	
6	JGVH-1	1000	15	2600	R	E	Fk	Y	3	10	85	61	137	83	33	29	120	6	61	54	73½	4	
7	JGVH-1X	1000	24	3000	R	E	Fk	Y	3	10	89½	65½	137	83	33	29	120	6	61	54	74½	4	
8	JGVH-1.5	1500	24	3600	R	E	Fk	Y	3	10	95½	65½	137	83	33	29	120	6	62	56	76½	4	
9	MEH-4	4000	24	9200	R	E	Fk	Y	3	5	104½	68½	158	83	42	63½	130	4	60	62	76*	4	
10	PHA-4	4000	24	5300	R	E-G	Pf	N	.....	.....	109	.....	.....	83	38	82	4	82	58	138	4	
11	PHB-4	4000	24	5300	R	E-G	Pf	N	.....	.....	113	.....	.....	83	38	82	4	88	60	145	4	
12	PLA-4	4000	24	4700	R	E-G	Pf	N	.....	.....	110	.....	.....	38	.....	13	4	84	59	139	4	
13	PLB-4	4000	24	4700	R	E-G	Pf	N	.....	.....	115	.....	.....	38	.....	13	4	90	61	145	4	
14	PTA-4	4000	24	5700	R	E-G	Pf	Y	.....	.....	109	.....	132	83	38	62	120	4	82	58	138	4
15	PTB-4	4000	24	5700	R	E-G	Pf	Y	.....	.....	113	.....	132	83	38	62	120	4	88	60	145	4
16	RHB-6	8000	24	5800	R	E-G	Pf	N	.....	.....	117	.....	.....	83	42	62	4½	93	62	150	4	
17	RLB-6	6000	24	5800	R	E-G	Pf	N	.....	.....	130	.....	.....	83	42	57	4½	110	69	168	4	
18	RLB-10	10000	24	6400	R	E-G	Pf	N	.....	.....	115	.....	.....	42	.....	13	4½	110	69	168	4	
19	RTB-6	6000	24	6200	R	E-G	Pf	Y	.....	.....	130	.....	128	83	42	.....	113	4½	93	62	150	4
20	Elwell-Parker																						
21	E-2	4000	24	3700	R	E-G	Pf	Y	.....	.....	113½	.....	134½	83	38	59	110	2½	100	63	148	3
22	E-11	4000	24	3300	R	E-G	Pf	Y	.....	.....	125½	.....	141½	83	31	65½	124	3	88	53	135	3
23	ELN-6	8000	24	4750	R	E-G	Pf	Y	.....	.....	138½	.....	142½	95	42½	70	118	3	131	76	188	3
24	ELN-16	16000	24	8100	R	E-G	Pf	N	.....	.....	139½	.....	.....	95	43	.....	57	3	128	76	185	3
25	EP-4-11	4000	24	3150	R	E-G	Pf	N	.....	.....	125½	.....	.....	43	.....	15½	4	100	69	158	3	
26	EP-6	6000	24	3200	R	E-G	Pf	N	.....	.....	125	.....	.....	42½	.....	5½	4	100	69	158	3	
27	EP-10	10000	24	3600	R	E-G	Pf	N	.....	.....	129	.....	.....	43	.....	5½	4	126	72	178	3	
28	F-24T	4000	24	8200	R	E-G	PF	Y	5	15	128	.....	140	83	39	59	117	4	80	72	133	3
29	F-25T	10000	24	15000	R	E-G	PF	Y	3	12	141	105	151	95	48½	139	4	129	92	162	3
30	F-26T	2000	24	5000	R	E-G	PF	Y	5	10	98½	69½	149	83	32½	65	130	3½	67	58	111	3
31	F-26T	2000	24	5000	R	E-G	PF	Y	5	10	98½	69½	119	68	32½	50	130	3½	67	58	111	3
32	F-30T	4000	24	7600	R	E-G	PF	Y	5	10	116½	80½	166	41	66	130	7	88	70	134	3
33	F-30T3	3000	24	7300	R	E-G	PF	Y	5	10	111½	75½	166	41	66	130	8	84	68	129	3
34	F-30T3	3000	24	7300	R	E-G	PF	Y	5	10	111½	.....	75½	136	.....	41	100	8	84	68	129	3
35	F-31T	6000	24	9955	R	E-G	PF	Y	5	10	120	84	162	42	64	130	6½	87	72	139	3
36	F-31T	6000	24	9955	R	E-G	PF	Y	5	10	120	84	132	42	49	100	6½	87	72	139	3
37	GEP-6	8000	24	3950	R	E-G	Pf	N	.....	.....	125	.....	.....	42½	.....	5½	4	102	72	.....	.....	.....
38	GF-26T	2000	24	3950	R	G	PF	Y	5	10	104½	74½	149	.....	32½	65	148	3½	78	58	112	3
39	GF-26T	2000	24	3950	R	G	PF	Y	5	10	104½	74½	119	.....	32½	50	118	3½	78	58	112	3
40	GF-30T	4000	24	7000	R	G	PF	Y	5	10	119½	83½	168	.....	41	66	130	6½	86	69	131	3
41	GF-30T	4000	24	7000	R	G	PF	Y	5	10	119½	83½	136	.....	41	51	100	6½	86	69	131	3
42	Hyster																						
43	QN-20	2000	15	3620	R	G	Fk	Y	3	11	101	71	132	79	37	0	108	3½	67	59	78*	3	
44	QN-20	1000	24	3020	R	G	Fk	Y	3	11	119	71	132	79	37	0	108	3½	80	59	76*	3	
45	QN-20	2000	24	3960	R	G	Fk	Y	3	11	121½	73½	132	79	37	0	108	3½	80	59	76*	3	
46	RT-100	10000	24	13600	R	G	Fk	Y	4	12	196	148	256	151	96	0	210	5	180	131	211*	4	
47	RT-150	15000	24	16350	R	G	Fk	Y	4	12	196	148	257	152	96	0	210	7	206	140	237*	4	
48	YT-40	4000	15	6130	R	G	Fk	Y	4	10	116	86	132	82	43	10	108	4½	79	72	82*	4	
49	XA-60	6000	24	9830	R	G	Fk	Y	3	13	154½	106½	134½	82½	51	9½	108	4½	114	86	135*	4	
50	ZA-80	8000	24	11100	R	G	Fk	Y	3	13	165½	117½	135½	84½	51½	9½	108	6½	129	99	150*	4	
51	Kalamazoo	301	800	1022	R	G	N	.....	5	34	81½	63½	.....	79½	33½	.....	16	3½	68	56	.....	4
52	Kwik Mix	Moto-Bug	1000	1500	R	G	Fk	N	N	N	88	68	.....	84	32	.....	60	3	69	54	88	3
53	Lift Trucks	KNS	6000	18-36	1300	W	E	Pf	N	.....	(l)	.....	.....	.....	.....	3½	.....	(m)	(l)	.....	4	
54	KNS	6000	18-36	1400	W	E	Pf	N	.....	.....	(l)	.....	.....	.....	.....	3½	.....	(m)	(l)	.....	4	
55	KPNS	4000	15-30	1200	W	E	Pal	N	.....	.....	(p)	.....	.....	.....	.....	4	.....	(q)	(p)	.....	4	
56	KWS	36-72	1600	W	E	Pf	N	.....	.....	.....	(l)	.....	.....	.....	.....	3½	.....	(t)	(l)	.....	4	
57	Lull	T10D2	10000	27	18000	R	D	Fk	Y	5	5	228	228	178	89½	.....	144	10	300	.....	120	4
58	T10G2	10000	27	18000	R	G	Fk	Y	5	5	228	228	178	89½	.....	144	10	300	.....	120	4	
59	Market Forge	Loadmobile	5000	.....	1400	R	E-G	Pf	N	.....	80½	44½	.....	45	30	.....	4	3	69½	.....	3	
60	Loadmobile	2000	15	2600	R	E-G	Fk	N	5	10	83½	.....	146	83	31	63	126	3	60	.....	3	
61	Loadmobile	6000	.....	1600	R	E-G	Pal	N	.....	.....	85½	49½	.....	45	30	.....	3	.....	.....	.....	3	
62	Mercury	A-1003	5000	5700	R	E	Pf	Y	.....	.....	116½	.....	129	83	41½	.....	113	4½	96	62	.....	4
63	A-1005	3000	.....	3500	R	E	Pf	Y	.....	.....	99½	.....	131	83	33½	.....	115	.....	82	52	.....	4
64	A-1013	10000	.....	6600	R	E	Pf	N	.....	.....	129½	.....	83	42	.....	57	3½	110	70	.....	4	
65	A-1017	4000	.....	4400	R	E	Pf	N	.....	.....	114	.....	.....	41½	.....	23	4½	96	62	.....	4	
66	A-1018	4000	.....	5500	R	E	Pf	Y	.....	.....	116½	.....	129	83	41½	.....	113	4½	96	62	.....	4
67	A-1484	4000	24	8555	R	E	Fk	Y	5	15	117½	83½	144	83	42	27	120	6½	85	72	149	4	
68	A-1544	6000	48	10910	R	E																	

-Industrial Trucks

Platform and Fork—(Continued)

PLATFORM OR FORK DIMENSIONS (In.)					ENGINE OR MOTOR	BATTERY		TRANS-MISSION		TRUCK SPEED								GRADE-ABILITY (Per Cent)		Dead Man Brake?	Line Number	
Standard Length	Standard Width	Height of Back	Height from Ground When Lowered	Lateral Adjustment of Forks	Make and Model	Horsepower	Normal Voltage	Ampere Hours	No. of Forward Speeds	No. of Reverse Speeds	Unloaded				Capacity Load				Unloaded			Capacity Load
											Forward (mph)	Reverse (mph)	Lifting (fpm)	Lowering (fpm)	Forward (mph)	Reverse (mph)	Lifting (fpm)	Lowering (fpm)				
30	4	20	1	8-31	Kimble		32	250	4	4	5	5	40	35	4 1/2	4 1/2	30	40	15	10	Y	1
36	4	20	1 1/2	8-31	Kimble		32	350	4	4	5	5	35	35	4 1/2	4 1/2	28	40	15	10	Y	2
36	4	20	1 1/2	8-31	Kimble		32	350	4	4	5	5	35	35	4 1/2	4 1/2	28	40	15	10	Y	3
36	5	22	1 1/2	10-32	Kimble		32	450	4	4	5	5	35	25	4 1/2	4 1/2	27	40	15	10	Y	4
24	4	20	1	8-31	Kimble		32	204	4	4	6	6	50	35	5 1/2	5 1/2	30	40	15	10	Y	5
24	4	20	1	8-31	Kimble		32	204			6	6	50	35	5 1/2	5 1/2	30	40	15	10	Y	6
24	4	20	1 1/2	8-31	Kimble		32	350			6	6	40	35	5 1/2	5 1/2	25	40	15	10	Y	7
24	5	22	1 1/2	10-38	Kimble		32	500	4	4	5	5	30	25	4 1/2	4 1/2	20	40	15	10	Y	8
24	24	7	7		Kimble		32	450	4	4	6	6	30	25	5 1/2	5 1/2	20	30	15	10	Y	9
27	27	11	11		Kimble		32	450	4	4	6	6	30	30	5 1/2	5 1/2	20	35	15	10	Y	10
48	24	7	7		Kimble		32	450	4	4	6	6	30	30	5 1/2	5 1/2	20	35	15	10	Y	11
24	24	7	7		Kimble		32	450	4	4	6	6	30	30	5 1/2	5 1/2	20	35	15	10	Y	12
24	24	7	7		Kimble		32	500	4	4	6	6	30	25	5 1/2	5 1/2	20	30	15	10	Y	13
54	24	7	11		Kimble		32	500	4	4	6	6	30	30	5 1/2	5 1/2	20	35	15	10	Y	14
54	27	11	11		Kimble		32	500	4	4	6	6	20	25	5	5	15	30	15	10	Y	15
60	27	11	11		Kimble		36	500	4	4	5	5	20	25	4	4	15	30	15	10	Y	16
54	27	11	11		Kimble		32	500	4	4	6	6	20	25	5	5	15	30	15	10	Y	17
60	27	11	11		Kimble		36	500	4	4	5	5	20	25	4	4	15	30	15	10	Y	18
60	27	11	11		Kimble		36	500	4	4	6	6	20	25	5	5	15	30	15	10	Y	19
48	26 1/2	6	6		EPE		30-72		4	4	6	6	30	20	5	5	12	20	10	Y	20	
41	18 1/2	7	7		EPE		30-72		4	4	4 1/2	4 1/2	20	22	4	4	14	25	10	Y	21	
48	27	11	11		EPE		30-72		4	4	6	6	25	12	4 1/2	4 1/2	12	14	10	Y	22	
48	27	11	11		EPE		30-72		4	4	5	5	8	15	4	4	18	10	10	Y	23	
60	32	11 1/4	11 1/4		EPE		30-72		4	4	4	4	7	14	3	3	17	9	10	Y	24	
54	26 1/2	10 1/2	10 1/2		EPE		36-60		4	4	6	6			4 1/2	4 1/2			10	Y	25	
54	26 1/2	10 1/2	10 1/2		EPE		36-72		4	4	6	6			4 1/2	4 1/2			10	Y	26	
36	4	36		-38	EPE		36-72		4	4	6	6			4 1/2	4 1/2			10	Y	27	
36	5	36		-38	EPE		36-72		4	4	5 1/2	5 1/2	13	20	5	5	25	15	10	Y	28	
36	4	36		-31 1/4	EPE		24-48		4	4	6 1/2	6 1/2	34	32	6	6	29	40	10	Y	29	
36	4	36		-31 1/4	EPE		24-48		4	4	6 1/2	6 1/2	34	32	6	6	29	40	10	Y	30	
36	4	36		-38	EPE		36-60		4	4	6	6	42	36	6 1/2	6 1/2	25	45	10	Y	31	
36	4	36		-38	EPE				4	4	7 1/2	7 1/2	40	36	6 1/2	6 1/2	37	35	10	Y	32	
36	4	36		-38	EPE				4	4	7 1/2	7 1/2	40	36	6 1/2	6 1/2	37	35	10	Y	33	
36	6	36		-40	EPE		36-60		4	4	5 1/2	5 1/2	40	36	5	5	20	40	10	Y	34	
36	6	36		-40	EPE		36-60		4	4	5 1/2	5 1/2	40	36	5	5	20	40	10	Y	35	
54	26 1/2	10 1/2	10 1/2		Cont.	34			4	4	6 1/2	6 1/2			6 1/2	6 1/2			15	Y	37	
36	4	36		-31 1/4	Herc	28			4	4	7 1/2	7 1/2	40	36	6 1/2	6 1/2	37	35	10	Y	38	
36	4	36		-31 1/4	Herc	28			4	4	7 1/2	7 1/2	40	36	6 1/2	6 1/2	37	35	10	Y	39	
36	4	36		-38	Herc	34			4	4	10 1/2	10 1/2	45	40	9 1/2	9 1/2	45	45	15	Y	40	
36	4	36		-38	Herc	34			4	4	10 1/2	10 1/2	45	40	9 1/2	9 1/2	45	45	15	Y	41	
30	4	18 1/2	1 1/4	1 1/2-22*	Wisc.	VF-4	25		2	2					13.7	11.9	55	55	28	19	N	42
30	4	18 1/2	1 1/4	1 1/2-22*	Wisc.	VF-4	25		2	2					13.7	11.9	55	55	28	19	N	43
48	4	18 1/2	1 1/4	1 1/2-22*	Wisc.	VF-4	25		2	2					13.7	11.9	55	55	28	19	N	44
48	6	21 1/4	2 1/4	21-48*	IHC	GRD-214	82.4		4	4					22.6	22.6	39	39	25	35	N	45
48	6	21 1/4	2 1/4	21-48*	IHC	GRD-214	82.4		4	4					22.6	22.6	35	35	18	23	N	46
30	5	17 1/2	1 1/2	21-28 1/2*	Wisc.	VF-4	25		2	2					14	14	45	45	24	14	N	47
48	5	19 1/2	2	14-34*	Herc	JX4C3	60		2	2					12 1/2	12 1/2	35	35	26	17	N	48
48	6	20 1/4	2	14-34 1/4*	Herc	JX4D3	68		2	2					10.9	10 1/2	35	35	25	15	N	49
18	3	9 1/2	0	6-32*	Wisc.	AEN	7 1/2		2	1	9	7			9		12	16			N	51
20	4	22 1/2		-32	Wisc.	AKN	6		1	1	4	4			4	4			12	12	N	52
(n) 18		(o)			Baldor	182-D	12	250-450	2	2	3	3	6		2	2	4				N	53
(n) 20		(o)			Baldor	182-D	12	250-450	2	2	3	3	6		2	2	4				N	54
(n) 24		(o)			Baldor	182-D	12	250-450	2	2	3	3	7		2	2	3 1/2				N	55
(n) 27		(o)			Baldor	182-D	12	250-450	2	2	3	3	7		2	2	3 1/2				N	56
(n) 27 1/2		(o)			Baldor	182-D	12	250-450	2	2	3	3	8		2	2	4				N	57
54	7		9		Hercules		77		5	1	30										N	58
54	7		9		Hercules		98		5	1	30										N	59
36	18	24 1/4	6		Baldor		3/4		2	2	4				2 1/2							60
28	3			1 1/2-30*	Baldor		3/4		2	2	3 1/2				3				10	5		61
36	11	26 1/2	3 1/4		Baldor		3/4		2	2	3 1/2				2 1/2							62
54	26 1/2	11			Mercury		30	330	3	3	6	6	22	25	4 1/2	4 1/2	11	50			Y	63
42	20	7			Mercury		30	450-550	4	4	5 1/2	5 1/2	35	18	4 1/2	4 1/2	16	40			Y	64
54	26 1/2	11			Mercury		30	450	3	3	6	6	22	25	4 1/2	4 1/2	10	40			Y	65
54	26 1/2	11			Mercury		30	450	3	3	6	6	22	25	4 1/2	4 1/2	13	50			Y	66
5	24	2		10-38*	Mercury		30	450	4	4	5 1/2	5 1/2	33	40	5	5	22	40			Y	67
42	5	24	2 1/4	10-38*	Mercury		36	450	4	4	5 1/2	5 1/2	34	40	5	5	17	40			Y	68
36	5	18	1 1/4	10-32*	Mercury		30	350	3	3	5 1/2	5 1/2	42	50	5	5	26	50			Y	69
36	5	21 1/2	1 3/4	10-32*	Mercury		30	350	3	3	5 1/2	5 1/2	42	50	5	5	26	50			Y	70
36	5	24																				

**Additional Specifications
on pages
96, 97, 112, 113**

DA SPECIFICATIONS

LIFT TYPE—Pallet,

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY		Service Weight (Lb.) (Unloaded but including battery)	Operation Type	Power Type	Lift Type	MAST		OVERALL DIMENSIONS (In.)										TURNING RADIUS (In.)				
		Weight (Lb.)	Load Center (In.)					Extending?	Forward (Deg.)	Rearward (Deg.)	Length		Height		Width	Free Lift	Max. Lift Elevation	Lowest Underclearance	With Platform or Forks	Turns in Intersecting Aisle	Minimum Aisle for Right Angle Stacking	Three or Four Point Suspension		
											With Platform or Forks	Without Platform or Forks	With Mast Extended	No Extension Mast										
1	Raymond—Continued	E3ST	3000	24	2750	R	E	Fk	Y		69		150	89	57	51	118	2	42	60	73	4		
2		E4P	4000	24	2300	R	E	Pal	N		70			83	30		64		39½	53	98	4		
3		EL4F	4000	24	2000	R	E	Pal	N		75½			48	30	4	7¼	2	40	58	72	4		
4	Revolator	648	2500	24	2500	W	E	Pal	Y			38	130	83	(1)	12	115			66		4		
5		648	2500	24	2400	W	E	Pal	Y			38	100	88	(1)	12	85			66		4		
6		648	2500	24	2150	W	E-G	PF	Y			38		83	(1)	12	84			66		4		
7		V4P	4000	30	1530	W	E-G	PF	N							32						4		
8		V4W	4000	30	1500	W	E-G	PF	N							32		4				4		
9		V6P	6000	30	1530	W	E-G	PF	N							32						4		
10		V6W	6000	30	1500	W	E-G	PF	N							32		4				4		
11		ZHF	2500	24	Var	W	E-G	Fk	N							32						4		
12		Z4H	4000	30	Var	W	E-G	Fk	Y		26½					32	12			Var		4		
13	Ross	5W	5000	15	5900	R	G	Fk	Y	6	12	121½	91½	136½		72	144	4.9	86½	78	130	3		
14		6	6000	24	9000	R	G	Fk	Y	6	12	157	115	142		64	72	144	6	105	92½	167½	3	
15		10H	12000	24	15100	R	G	Fk	Y	4	12	188	146	188½		80	6	240	6.3	133	123	200	3	
16		10L	8000	24	12785	R	G	Fk	Y	4	12	188	146	188½		80	6	240	5.7	133	123	200	3	
17		10M	10000	24	13700	R	G	Fk	Y	4	12	188	146	188½		80	6	240	5.7	133	123	200	3	
18		12	18000	26	17906	R	G	Fk	Y	4	12	222	180	188½		96½	6	240	7	277	169	346	3	
19		15LH	18000	26	17546	R	G	Fk	Y	4	12	227½	185½	188½		96½	6	240	7	175	158	245	3	
20		15LL	15000	27	17546	R	G	Fk	Y	4	12	227½	185½	188½		96½	6	240	7	175	158	245	3	
21		15SH	15000	25	16613	R	G	Fk	Y	4	12	207½	165½	188½		96½	6	240	7	153	141	222	3	
22		15SL	13000	25	15413	R	G	Fk	Y	4	12	207½	165½	188½		96½	6	240	7	153	141	222	3	
23		24	26000	36	31180	R	G	Fk	N	4	12	296½	224½			224	114	N	245	9	210	317	182	3
24	Service Castor	S-4024	4000	24	7000	R	G	Fk	Y	3	10	121	81	148	83	40	62	128	3¾	75	67	92½	4	
25	Silent Hoist	FK5	10000	24	14500	R	GD	Fk	Y	4	12	192	150	(6)	(7)	83	N	216	9	130	135	140	3	
26		FK7½	15000	24	19000	R	GD	Fk	Y	4	12	211	160	(6)	(7)	92	N	216	9	153	143	150	3	
27		FK10	20000	24	20000	R	GD	Fk	Y	4	12	231	180	(8)	(9)	95	N	216	9	186	148	168	3	
28	Towmotor	LT-35	1500	15	(10)	R	G	Fk	Y	5	10	89½	59½	(13)	(15)	35	(16)	(17)	5	58	55	98½	4	
29		LT-35	2000	15	(11)	R	G	Fk	Y	5	10	89½	59½	(13)	(15)	35	(16)	(17)	5	58	55	98½	4	
30		LT-35	2000	24	(12)	R	G	Fk	Y	5	10	91½	61½	(14)	(15)	35	(16)	(17)	5	60	55	101½	4	
31		LT-50	5000	20	(18)	R	G	Fk	Y	5	10	124	88	(19)	(20)	42	(21)	(22)	6	90	71½	141	4	
32		LT-50	6000	24	(23)	R	G	Fk	Y	5	10	136	94	(19)	(20)	42	(21)	(22)	7	96	75½	153	4	
33		LT-60	4000	24	(24)	R	GD	Fk	Y	5	10	148½	106½	(27)	(28)	55	(13)	(29)	10½	125	87	187½	4	
34		LT-60	5000	24	(25)	R	GD	Fk	Y	5	10	148½	106½	(27)	(28)	55	(13)	(29)	10½	125	87	187½	4	
35		LT-60	6000	24	(26)	R	GD	Fk	Y	5	10	148½	106½	(27)	(28)	55	(13)	(29)	10½	136	88½	189½	4	
36		LT-72	7000	24	(32)	R	GD	Fk	Y	5	10	143	101	(33)	(34)		(35)	36	7	104	80	120	4	
37		LT-72	10000	24	(37)	R	G	Fk	Y	5	10	153½	111½	(38)	(39)	53	(17)	(40)	7	115	89½	173½	4	
38		LT-90	15000	24	(41)	R	G	Fk	Y	3	10	176	134	(42)	(43)	58½	22	(40)	8	145	104	207	4	
39		W	4000		(44)	W	E	Pal	N	N	N	30	30			46	(45)		1	71½			3	
40		390	3000	15	(47)	R	G	Fk	Y	5	10	101½	71½	(48)	(49)	37½	(16)	(50)	5½	68	61	110½	4	
41		400-P	2000	24	(51)	R	G	Fk	Y	3	12	104	74	(52)	(53)	34½	(54)	(55)	7	72	60½	117½	4	
42		420	4000	15	(56)	R	G	Fk	Y	5	10	110½	74½	(48)	(49)	37½	(16)	(50)	5½	71	63½	119½	4	
43		460	4000	24	(57)	R	GD	Fk	Y	5	10	114½	76½	(48)	(49)	37½	(16)	(50)	5½	75	65	123½	4	
44		480-P	4000	24	(60)	R	GD	Fk	Y	5	10	124½	88½	(61)	(62)	42	(16)	(55)	9	85	71	139½	4	
45	Transitler	200	2000	15	3200	R	G	Fk	Y	4	10	100	70	128	78	36	8	108	4		66		3	
46		250	2500	15	3600	R	G	Fk	Y	4	10	105	75	128	78	36	8	108	4		71		3	
47		300	3000	15	4400	R	G	Fk	Y	4	10	104	74	130	82	36	10	108	4		70		3	
48		4824	4000	24	6300	R	G	Fk	Y	4	14	132	96	143	83	44	60	120	4		75		4	
49		5015	5000	15	6300	R	G	Fk	Y	4	14	132	96	143	83	44	60	120	4		75		4	
50	Wright-Hibbard	RBH-11	2000		2660	R	E	PF	N			83		46½	30		4			62			4	
51		RBH-11	3000		2710	R	E	PF	N			83		46½	30		4			62			4	
52		RBH-11	4000		2785	R	E	PF	N			83		46½	30		4			62			4	
53		RBH-20	2000		2660	R	E	PF	N			94		46½	30		4			67½			3	
54		RBH-20	3000		2710	R	E	PF	N			94		46½	30		4			67½			3	
55		RBH-20	4000		2785	R	E	PF	N			94		46½	30		4			67½			3	
56		TRC-3	2000		3610	R	E	PF	N			100		75	30		60			75	52		3	
57		TRC-3	3000		3680	R	E	PF	N			100		75	30		60			75	52		3	
58		TRC-3	4000		3710	R	E	PF	N			100		75	30		60			75	52		3	
59		224-A	2000	24	6050	R	E	Fk	Y	4	10		72½	127	72	30	53	108	5½	71½			4	
60		324-A	3000	24	6350	R	E	Fk	Y	4	10		73½	127	72	30	53	108	5½	71½			4	
61		* 424-A	4000	24	6900	R	E	Fk	Y	4	10		77½	127	72	30	53	108	5½	84			4	
62	Yale & Towne	J-25-W7-48	2500		300	W	E	PF	N			48				24		3	3½				4	
63		K51AT-50	4000	24	7950	R	E	Fk	Y	6½		111½	112½	82½	164	100	41½	17	130	3	75	68	127	4
64		K61AT-40	4000	24	7150	R	G	Fk	Y	6½		111½	118½	82½	164	83	39	17	130	3	75	67	128	4
65		K61AT-40	4000	24	7150	R	D	Fk	Y	6½		111½	118½	82½	164	83	39	17	130	3	75	67	126	4
66		N-25-TTF	2500	24	4125	W	E	Fk	Y	2	18		99½	67½	149	83	35	60½	120	2½	59	102½	3	

ABBREVIATIONS

- *—Plus load length.
- †—Above forks.
- ▲—Does not include battery.
- Inside measurement.
- Outside measurement.
- ▲—Plus fork length.
- (a)—7530 for 44" wheelbase; 7350 for 48" wheelbase.
- (b)—73½ for 44" wheelbase; 77½ for 48" wheelbase.
- (c)—74 for 44" wheelbase; 78 for 48" wheelbase.
- (d)—66½ for 44" wheelbase; 68½ for 48" wheelbase.
- (e)—88½ for 44" wheelbase; 92½ for 48" wheelbase.

- (f)—Electric for 44" wheelbase; electric or gas-electric for 48" wheelbase.
- (g)—8455 with lead acid battery; 8323 with alkaline battery.
- (h)—115½ with lead acid battery; 116½ with alkaline battery.
- (i)—78½ with lead acid battery; 79½ with alkaline battery.
- (j)—10485 with lead acid battery; 10483 with alkaline battery.
- (k)—11209 with lead acid battery; 11183 with alkaline battery.
- (l)—68½ to 103½.
- (m)—41 to 57.
- (n)—36 to 72.
- (o)—6, 7, 9 and 11.
- (p)—63½ to 93½.
- (q)—45 to 50½.

- (r)—30 to 60.
- (s)—44½ to 60½.
- (t)—44½ to 60½.
- (u)—94 to 176.
- (v)—63 to 83.
- (w)—37 to 57.
- (x)—68 to 117.
- (y)—96 to 136.
- (z)—36 to 56.
- (1)—Built to pallet size.
- (2)—32, 36, 42, 48, 54 and 60.
- (3)—36, 42, 48, 54, 60,

-Industrial Trucks

Platform and Fork--(Continued)

Additional Specifications
on pages
96, 97, 112, 113

PLATFORM OR FORK DIMENSIONS (In.)					ENGINE OR MOTOR		BATTERY		TRANSMISSION		TRUCK SPEED								GRADE- ABILITY (Per Cent)		Dead Man Brake?	Line Number
Standard Length	Standard Width	Height of Back	Height from Ground When Lowered	Lateral Adjustment of Forks	Make and Model	Horsepower	Normal Voltage	Ampere Hours	No. of Forward Speeds	No. of Reverse Speeds	Unloaded				Capacity Load				Unloaded	Capacity Load		
											Forward (mph)	Reverse (mph)	Lifting (fpm)	Lowering (fpm)	Forward (mph)	Reverse (mph)	Lifting (fpm)	Lowering (fpm)				
40	4	26	3	13-31	Baldor	1	12	400	3	3	3 3/4	3 3/4	21	25	3	3	10	25	16	8	Y	1
42	24	18	6		Baldor	1	12	400	3	3	3 3/4	3 3/4		15	2 1/4	2 1/4	8	15	15	8	Y	2
44	9 1/2		3 1/4		GE	1 1/2	12	400	3	3	3 3/4	3 3/4			3 1/4	3 1/4			15	8	Y	3
36	4		2 1/2		Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2			12	10	Y	4
36	4		2 1/2		Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2			12	10	Y	5
36	4		2 1/2		Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2			12	10	Y	6
(2) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	7
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	8
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	9
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	10
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	11
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	12
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	13
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	14
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	15
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	16
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	17
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	18
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	19
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	20
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	21
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	22
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	23
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	24
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	25
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	26
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	27
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	28
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	29
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	30
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	31
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	32
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	33
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	34
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	35
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	36
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	37
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	38
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	39
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	40
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	41
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	42
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	43
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	44
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	45
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	46
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	47
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	48
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	49
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	50
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	51
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	52
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	53
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	54
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	55
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	56
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	57
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	58
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	59
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	60
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	61
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	62
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	63
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	64
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	65
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	66
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	67
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	68
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	69
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2					Y	70
(3) 27	(4) 27		3 1/4	N	Auto-Lite		12	300	2	2	3.3	3.3			2.2	2.2						

DA SPECIFICATIONS

STATIONARY PLATFORM AND

Shown below is, to the best of our knowledge, the first listing in any publication in our field of the essential specifications of Industrial Stationary Platform Trucks and Towing-Type Tractors. Due to space limitations basic models only are

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY				Operation Type	Power Type	OVERALL DIMENSIONS (In.)				TURNING DIMENSIONS (In.)				TREAD (In.)		PLATFORM DIMENSIONS (In.)			
		Weight (Lb.)	Drawbar Pull (Lb.)	Trailing Load (Ton) (On dry, level concrete)	Service Weight (Lb.) (Unloaded, but including Battery)			Length	Width	Height	Lowest Underclearance	Turning Radius	Wheel Base	Turns in Intersecting Aisle	Three or Four Point Suspension	Front	Rear	Standard Length	Standard Width	Height of Back	Height from Ground
1	Atlas HP-3	6000			3800	R	E	111	46	50	5 1/4	93	55	68	4	33 1/2	46	90	46	24	25 1/2
2	2-WT-2		2500	50	4900	R	E-G	72	42	60	7 1/2	90	45 1/2	68	4	23	33 1/2				
3	3-DWT-2		2100	40	4025	R	E-G	72	42	60	7 1/2	83 1/2	45 1/2	63 1/2	3	9 3/4	33 1/2				
4	3-LWH	6000			3900	R	E-G	116 1/2	42	50	4 1/2	92	60	66	4	34 1/2	30	60	42	18	11
5	Buda HA-75		9000		12400	R	G	125 1/2	66	66	14	164	72	103	4	56	53 1/2				
6	HB-75		7500		12200	R	G	125 1/2	66	66	14	164	72	103	4	56	53 1/2				
7	HA-90		9000		13400	R	G	125 1/2	66	66	14	164	72	103	4	56	53 1/2				
8	HB-90		9000		13200	R	G	125 1/2	66	66	14	164	72	103	4	56	53 1/2				
9	HA-120		12000		15980	R	G	125 1/2	66	66	14	164	72	114	4	56	65 1/2				
10	HB-120		12000		15780	R	G	125 1/2	66	66	14	164	72	114	4	56	65 1/2				
11	JD-230	4200	4500		5880	R	De	102	66	61	9 1/2	118	62	87	4	44	49				
12	JG-230		4500		5735	R	G	102	66	61	9 1/2	118	62	87	4	44	49				
13	Clark 5		500		1850	R	G	61	29	54 1/2	2 1/4	50	34	41 1/2	3	22 1/2	23 1/2				
14	20		2000		3200	R	G	68	39	54 1/2	3 1/2	62	40	52	4	22 1/2	33				
15	26		2600		3400	R	G	68	39	54 1/2	3 1/2	62	40	52	4	22 1/2	33				
16	21		2100		3085	R	G	94	52	57	5 1/4	108	57		4	43 1/2	44				
17	30		3000		3685	R	G	100	52	58	5 1/4	118	59		4	43 1/2	43				
18	40		4000		4735	R	G	100	65 1/2	57	5 1/4	120	59		4	43 1/2	55				
19	46		4600		6200	R	G	100	65 1/2	57	5 1/4	120	59		4	43 1/2	55				
20	120		12000			R	G	111	51	65	7	127	69	110	4	45	80 1/2				
21	Trucktractor	4000				R	E	111	51	65	7	127	69	110	4	45	80 1/2				
22	Tug Tractor		700		(k)	R	E	49 1/2	32	51 1/2		48 1/2	30 1/2	50	3			58	51	0	35 1/2
23	Crescent JN-1.5		1500		2700	R	E-G	59	33	51	6	56	35	52	3	12	29				
24	JN-2		2000		4600	R	E-G	68	40	61 1/2	6	63 1/2	40	61	3	14	36				
25	JW-1.5		1500		2700	R	E-G	59	33	51	6	64	35	60	3	26	29				
26	JW-2		2000		4600	R	E-G	68	40	61 1/2	6	63 1/2	40	61	3	24	36				
27	MN-3		3000		6150	R	E-G	79 3/4	42	59	6	88	45	65	3	16	37				
28	MW-4		4000		5500	R	E-G	79 3/4	42	59	6	88	45	65	3	17	36				
29	MW-3		3000		5000	R	E-G	79	42	61 1/2	6	98	45	72	4	33	37				
30	MW-4		3000	17 1/2	5650	R	E-G					98	45	72	4	34	36				
31	N-3		3000		2850	R	E	79 3/4	42	59		68	45	65	3						
32	PDB-4	4000			4800	R	E-G	118 1/2	42	52 1/2	5	100	67	68	4	38	24	60	42		12
33	PSE-4	4000			3800	R	E-G	112 1/2	42	53 1/2	4 1/4	101	66 1/2	67	4	37	37	90	42		26
34	RDB-6	6000			5800	R	E-G	118 1/2	42	52 1/2	5	100	67	68	4	37	37	90	42		12
35	RDC-10	10000			8600	R	E-G	131	42	52 1/2	5	110	74	72	4	36	26	72	42		12
36	RSE-6	6000			3900	R	E	112 1/2	42	53 1/2	4 1/4	101	66 1/2	67	4	37	37	90	42		26
37	RSE-10	10000			4500	R	E	112 1/2	42	53 1/2	4 1/4	111	66 1/2	67	4	36	36	90	42		26
38	W-3	3000			3000	R	E	79	42	59		98	45	72	4						
39	W-3	3000			3030	R	E	79	42	61 1/2		98	45	72	4						
40	Gar-Bro 1200	2000			1200	R	G	99	48		4	96	60	72	4	43	43	60	48	44	26
41	1400	4000			1650	R	G	121	52	56	6	120	76	96	4	46	46	60	52	48	26
42	Hydator Cargo	4000	543	543	1510	R	G	103 1/2	42	58	3	89	73 1/2	72	3	28	28	60	42	50 1/4	7 1/4
43	Pallet	4000	543	543	1360	R	G	85	35	55	1	76	64 1/2	53	3	28	36	27	24 1/4		
44	Platform	4000	543	543	1095	R	G	97	35	50	3	83	56	59	3	28	42	18	18		
45	Tug		543	543	1180	R	G	74	42	50	6	51	36	55	3	36					
46	Kalamazoo 2500	3500	600	10	1150	R	G	96	42	48	9	64	59	51	3	33	54	42			18 1/2
47	3600	3500	1200	20	1850	R	G	84	42	48	9	59	51		3	33	37	42			20
48	Kwik-Mix Moto-Bug	1500			830	RW	E	80 1/2	32	43	3	61	36 1/2	54	3	27					20 1/2
49	Lift Trucks KT		200-500		1200	W	E	42	28 1/2	28 1/2	2	24 1/2	33 1/2	4	10	7					
50	KTRS		200-500		1400	R	E	45	(a)	(a)	2	27 1/2			4	10	7				
51	KTS		200-500		1150	W	E	34 1/2	(a)	(a)	2	19 1/4			4	10	7				
52	Market Forge Freight Truck	1325	(b)	10	1450	R	E-G	92 1/2	37	45	5 1/2	74	55 1/2	48	3	7	5	57	30	30	13 1/2
53	Tractor	1325	(b)	10	1325	R	E-G	48	30	45	4	46	25 1/2	36	3	7	5				
54	Mercury A-440-25	3000	2300	60	3000	R	G	70 1/2	40	56	8	54 1/2	41 1/2	58	3	35					
55	A-440-26	3600	2600	65	3600	R	G	70 1/2	40	56	8	54 1/2	41 1/2	58	3	35					
56	A-452-58	3900	3000	75	3900	R	G	102	50	66	11	120	60	78	4	38	40 1/2				
57	A-452-60	4800	4000	100	4800	R	G	102	67	66	10	120	60	86	4	38	(e)				
58	A-452-61	6000	5000	125	6000	R	G	102	67	66	10	120	60	86	4	38	(e)				
59	A-540	2400	2000		(f)	R	E	73 1/2	41	60	8 1/2	67	45	62	4	10	35				
60	A-540	2550	2500		(g)	R	E	73 1/2	41	60	8 1/2	82	44		4	23 1/2	35				
61	A-560	1450	1000		(h)	R	E	70	34	51 1/2	8	60 1/2	41	59	3	27					
62	A-800-4	5400	5500		8700	R	E	94	44	66 1/2	8 1/2	100	60		3	34 1/2	34 1/2				
63	A-823	2000			(i)	R	E	114 1/2	40	51 1/2	8	82	63		3	34 1/2	32 1/2	61 1/2	40		22
64	Moto-Truc PPT	650			1050	RW	E-G	40	28		4				3						
65	Prime Mover 15	1500			632	W	E-G	72 1/2	31 1/2	38 1/2	4	33	34 1/2								
66	Revolver TT		700		1450	W	E-G											44	30		
67	Rocky Mountain B	900	450		1380	R	E	96	(j)	18		98	52	80	3	12	28	62	40	18	42
68	BT	1100	475	10	1780	R	E	77	37	48		63	30	56	3	12	28				
69	DCT	1225	475	7	1905	RW	E	77	37	52		56	30	56	3	12	28				
70	O-S	800	400		1240	R	E	93	38	18		95	48	75	3	12	28	60	36	18	48
71	Towmotor K5-30	3000	73		3600	R	G	67	40 1/2	54	8 1/2	64	36 1/2	56	4	33 1/2	30 1/2				
72	K5-33	3300	80		3990	R	G	67	40 1/2	54	8 1/2	64	36 1/2	56	4	33 1/2	30 1/2				
73	K5-36	3600	88		4260	R	G	67	40 1/2	54	8 1/2	64	36 1/2	56	4	33 1/2	30 1/2				
74		4000	98		4680	R	G	67	40 1/2	54	8 1/2	64	36 1/2	56	4	33 1/2	30 1/2				

ABBREVIATIONS
 *—Torque converter.
 †—And up.
 (a)—Depends on battery used.

(b)—750 with 3/4 h.p. motor; 1,000 with 1 h.p. motor.
 (c)—3/4 or 1.
 (e)—41 1/2 and 58 (dual wheels).

(f)—3350 to 3750.
 (g)—3880 to 4200.
 (h)—2475 to 2780.
 (i)—1800 to 2100.

(j)—36 to 40.
 (k)—1970 with lead acid battery; 2000 with alkaline battery.
 Chrysa—Chrysler.

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-Industrial Trucks

TOWING TRACTOR TYPES

presented for the eighteen companies represented. A multitude of variations, to fit the needs of the individual user of this type of equipment, are available from any one or all of the manufacturers listed.

ENGINE				MOTOR (ELECTRIC)		BATTERY		TRANS-MISSION		CLUTCH		TRAVEL SPEED (mph)				GRADE-ABILITY (Per Cent)		Dead Man Brake?	Line Number	
Make and Model	Number of Cylinders Bore and Stroke	Horsepower at R.P.M.	Torque at R.P.M.	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Type Reduction	No. of Speeds		Type	Size (Diameter In.)	Unloaded		Capacity Load		Unloaded			Capacity Load
									Forward	Reverse			Forward	Reverse	Forward	Reverse				
				Atlas 1175	5	30	306	D	3	3			6	6	4½	4½	33	21	Y	1
				Atlas 1175	5	48	306	D	3	3			7	7	3½	3½	47	5	Y	2
				Atlas 1175	5	36	306	D	3	3			7	7	3½	3½	50	5	Y	3
				Atlas 1175	5	30	306	D	3	3			6	6	4½	4½	33	21	Y	4
Buda 68-230	6-3½x4½	74-3200	164-950					D*	4	1	F	11	15	2					N	5
Buda 68-230	6-3½x4½	74-3200	164-950					D*	4	1	F	11	15	2					N	6
Buda 68-230	6-3½x4½	74-3200	164-950					D*	4	1	F	11	15	2					N	7
Buda 68-230	6-3½x4½	74-3200	164-950					D*	4	1	F	11	15	2					N	8
Buda 68-230	6-3½x4½	74-3200	164-950					D*	4	1	F	11	10½	1½					N	9
Buda 68-230	6-3½x4½	74-3200	164-950					D*	4	1	F	11	10½	1½					N	10
Buda 68-230	6-3½x4½	74-3200	164-950					D	4	1	F	11	20½	2½					N	11
Buda 68-230	6-3½x4½	74-3200	164-950					D	4	1	F	11	20½	2½					N	12
Cont. N-62	4-2½x3½	15-2400	42-								F	8	6½	7.2					N	13
Cont. Y-112	4-3½x3½	30-2200	83-					D	3	1	F	9	10	2.3					N	14
Cont. Y-112	4-3½x3½	30-2200	83-					D	3	1	F	10	12	2.3					N	15
Chrys. Ind-5	6-3½x4½	61-1800	178-					D	3	1	F	10	12½	3					N	16
Chrys. Ind-5	6-3½x4½	61-1800	178-					D	3	1	F	10	12½	3					N	17
Chrys. Ind-5	6-3½x4½	61-1800	178-					D	3	1	F	10	12	2.8					N	18
Chrys. Ind-5	6-3½x4½	61-1800	178-					D	3	1	F	10	12	2.8					N	19
Chrys. 16A	6-3½x4½	114-3200	215-					D	4	1	F	11	16.3	2.2					N	20
				General Electric	5	12		T	2	2			3½	3½	2½	2½				21
																				22
				Kimble		32	204	D	4	4			7	7	4		15	5	Y	23
				Kimble		36	400	D	4	4			7	7	4		15	5	Y	24
				Kimble		32	204	D	4	4			7	7	5		15	5	Y	25
				Kimble		36	400	D	4	4			7	7	4		15	5	Y	26
				Kimble		36	450	D	4	4			6	6	3½		15	5	Y	27
				Kimble		36	500	D	4	4			6	6	3½		15	5	Y	28
				Kimble		36	450	D	4	4			6	6	3½		15	5	Y	29
				Kimble		36	500	D	4	4			6	6	3½		15	5	Y	30
				Kimble		30		D	4	1			6	6		5			Y	31
				Kimble		32	350	D	4	4			6	6	5	5	15	10	Y	32
				Kimble		32	306	D	4	4			6	6	5	5	15	10	Y	33
				Kimble		32	450	D	4	4			6	6	5	5	15	10	Y	34
				Kimble		36	450	D	4	4			6	6	5	5	15	10	Y	35
				Kimble		32	304	D	4	4			6	6	5	5	15	10	Y	36
				Kimble		32	340	D	4	4			6	6	5	5	15	10	Y	37
				Kimble		5		D	4	1			6	6	5	5			Y	38
				Kimble		30		D	4	1			6	6	5	5			Y	39
Gladden Willys	1-2½x3	7-3200						S	3	1	F	6	26	7	20	5			N	40
Wiac. AKN	1-2½x4½	72-4000	156.3-4000					S	3	1	F	9	35	10	35	10			N	41
Wiac. AKN	1-2½x2½	6-3600	125-2400					V	V	V	F	6	12	8			32	9	N	42
Wiac. AKN	1-2½x2½	6-3600	125-2400					V	V	V	F	6	12	8			32	9	N	43
Wiac. AKN	1-2½x2½	6-3600	125-2400					V	V	V	F	6	12	8			32	9	N	44
Wiac. AKN	1-2½x2½	6-3600	125-2400					V	V	V	F	6	12	8			32	9	N	45
Wiac. TF	2-½x3½	13-2600	32½-1800					V	3	1	F	6½	15	3	10	2			N	46
Wiac. AKN	1-2½x2½	6-3600	125-2400					V	1	1	F	6½	15	3	10	2			N	47
				Baldor 182-D	¾	12	250-450		2	2			3	3	2	2		20	N	48
				Baldor 12	¾	12	250-450		2	2			3	3	2	2			N	49
				Baldor 182-D	¾	12	250-450		2	2			3	3	2	2			N	50
				Baldor	(c)	12	(d)		2	2			4½	4½	3	3	18	8	Y	51
				Baldor	(c)	12	(d)		2	2			4½	4½	3	3	22	8	Y	52
Wauk. FC-90	4-3½x4	16.9-2000						S	3	1	F	8	2.1	5.1	2.1				N	53
Wauk. FC-90	4-3½x4	16.9-2000						S	3	1	F	8	2.1	5.1	2.1				N	54
Chrys. 8A-114	6-3½x4½	53-1800	155-1800					S	4	1	F	10	10	1.6	6	1.6			N	55
Chrys. 8A-114	6-3½x4½	70-2400	155-2400					S	4	1	F	10	12½	2½	10	2½			N	56
Chrys. 8A-114	6-3½x4½	70-2400	155-2400					S	4	1	F	10	12½	2½	10	2½			N	57
				Mercury	36	450		D	4	4			6½	6.1	3½	3½			Y	58
				Mercury	48	300		D	4	4			7.4	7.4	3.7	3.7			Y	59
				Mercury	36	300		D	4	4			3	3					Y	60
				Mercury	48	550		D	4	4			6½	6½	3	3			Y	61
				Mercury	30	250		D	3	3			8	8	6½	6½			Y	62
				Auto-Lite	1½	12-18		S	2	2			2½	2½	10	10	15	5	Y	64
Wisconsin	1-2½x2½	6-3100		Auto-Lite		12	3001		1	1	F		4	2	4	2		20	Y	65
				Rocky Mountain	3¼	32	200		2	2			3.3	3.3	2.2	12	10		N	66
				Rocky Mountain	3¼	32	250		4	4			10	8	8	8	22	10	Y	67
				Rocky Mountain	3¼	32	200		3	3			10	10	7	7	18	8	Y	68
				Rocky Mountain	3¼	24-32	182		4	4	E	7¾	7¾	7¾	6	6	18	12	Y	70
Cont. F-162	4-3½x4½	41-2000	116-1500					D	2	2	F	11	10						N	71
Cont. F-162	4-3½x4½	41-2000	116-1500					D	2	2	F	11	10						N	72
Cont. F-162	4-3½x4½	41-2000	116-1500					D	2	2	F	11	10						N	73
Cont. F-162	4-3½x4½	41-2000	116-1500					D	2	2		11	10						N	74

STATISTICAL DATA MATERIALS HANDLING EQUIPMENT

Conveyors and Conveying Equipment

Except overhead traveling cranes and monorail systems

Industry Division, Bureau of the Census

Type	Quantity (Units)	Value f.o.b. Plant
Farm elevators, portable		
Single chain	18,782	\$ 2,888,000
Double chain	18,032	5,931,000
Auger type	19,250	2,356,000
Farm elevators, stationary	1,301	603,000
Parts and attachments, and those not reported by type		4,363,000
Conveyors and conveying systems		142,573,000
Gravity conveyors (skate wheel and roller)		10,262,000
Power conveyors (excluding overhead trolley systems, pneumatic tube systems, and portable conveyors)		17,604,000
Overhead trolley conveyor systems		10,904,000
Pneumatic tube systems (incl. foot-power units)		2,200,000
Portable conveyors (except farm)		14,583,000
Other conveyors and conveying systems		87,020,000
Parts, attachments, and accessories sold separately		34,754,000
Conveyors and conveying equipment, not reported by type		3,364,000
Total—1947		\$196,882,000
Total—1950		\$181,137,000
Total—1951		\$254,732,000

Overhead Traveling Cranes and Monorail Systems

Industry Division, Bureau of the Census

Type	Quantity (Units)	Value f.o.b. Plant
Overhead traveling cranes:		
Electric	2,149	\$27,987,000
Hand Power	1,042	1,258,000
Monorail systems		7,997,000
Total—1947		\$37,242,000
Total—1950		\$59,559,000
Total—1951		\$92,889,000

Industrial Trucks, Tractors, Trailers & Portable Elevators

Industry Division, Bureau of the Census

Type	Quantity (Units)	Value f.o.b. Plant
Powered trucks, operator walking	7,469	\$ 8,053,000
Powered trucks, operator riding	20,385	66,437,000
Fork trucks	17,943	56,970,000
Electric (storage battery and gasoline-electric powered)	3,522	15,212,000
Gasoline powered	14,421	41,758,000
Other trucks	2,442	9,467,000
Electric (storage battery and gasoline-electric powered)	1,300	5,667,000
Gasoline powered	1,142	3,800,000
Tractors	2,460	3,890,000
Electric (storage battery and gasoline-electric powered)	199	367,000
Gasoline powered	2,261	3,523,000
Portable elevators ¹	4,653	3,162,000
Hand trucks and trailers		29,430,000
Hand lift		8,373,000
Other ²		21,057,000
Parts, attachments, and miscellaneous equipment, sold separately ³		41,572,000
Industrial trucks and tractors, not reported by type		4,210,000
Total—1947		\$156,754,000
Total—1949		\$151,573,000
Total—1950		\$166,259,000
Total—1951		\$285,248,000

¹ Does not include farm elevators. ² Includes two-wheel, four-wheel, dollies, and platform trucks. ³ Includes pallets and skids.

Value of Shipments of Excavating and Earthmoving Equipment

Industry Division, Bureau of the Census

Class of Product	1952*	1951	1950	1949	1948
Power cranes and shovels	\$149,446,000	\$180,680,000	\$109,006,000	\$ 89,204,000	\$158,586,000
Road construction and maintenance machinery	125,761,000	151,779,000	117,540,000	96,883,000	117,908,000
Construction machinery for mounting on tractors	57,610,000	84,816,000	58,769,000	38,177,000	44,546,000
Track laying tractors ¹	205,298,000	263,579,000	223,042,000	196,622,000	167,341,000
Wheel-type tractors (contractors off-highway type)	55,221,000	55,238,000	24,769,000	12,499,000	13,942,000
Trucks, truck tractors, and trailers, off-highway type	26,086,000	36,840,000	22,856,000	N.A.	N.A.
Portable well and blast hole drills	4,780,000	5,818,000	4,472,000	6,774,000	10,914,000
Other excavating and earth moving equipment	2,846,000	6,208,000	1,692,000	(1)	(1)
Total	\$628,048,000	\$764,958,000	\$314,335,000	\$231,038,000	\$332,053,000

N.A.—Not available. (1)—Included in road construction and maintenance machinery for mounting on tractors.
*—First nine months.

Shipments of Industrial Electric Trucks and Tractors*

	1952	1951	1950	1949	1948
Jan.	658	440	199	204	314
Feb.	681	461	183	270	351
Mar.	702	595	229	247	331
Apr.	643	397	204	199	337
May	652	464	203	208	331
June	648	604	268	204	292
July	394	538	199	168	255
Aug.	564	591	237	202	275
Sept.	516	447	263	185	256
Oct.	588	587	290	254	333
Nov.	622	728	242	227	309
Dec.	741	673	291	232	337
Total	7,409	6,525	2,808	2,600	3,447

* Industrial Truck Association. Data represents 75 to 80 per cent of industry.

Shipments of Paper Product Shipping Containers

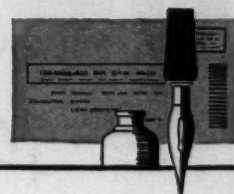
Industry Div., Bureau of the Census

Class of Products	Value at Plant
Shipping Sacks	
Total—1947	\$ 153,209,000
Total—1950	\$ 188,226,000
Total—1951	\$ 251,302,000
Shipping Containers	
Total—1947	\$ 833,858,000
Total—1950	\$ 926,927,000
Total—1951	\$1,160,362,000
Folding Boxes and Cartons	
Total—1947	\$ 401,447,000
Total—1950	\$ 508,778,000
Total—1951	\$ 667,261,000
Set-up Boxes	
Total—1947	\$ 210,671,000
Total—1950	\$ 199,766,000
Total—1951	\$ 218,779,000
Total—Sacks, Containers, Boxes	
1947	\$1,559,185,000
1950	\$1,823,691,000
1951	\$2,297,705,000

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Literature



Trade Show Shipping

North American Van Lines has published "How To Move Trade Show Exhibits" which should be of interest to those firms planning to exhibit at one or more of the many shows scheduled this year.

Circle 326 on Service Card, Page 35

Free Safety Posters

A new series of eight safety posters, designed to remind industrial truck operators of safe driving and operating practices, has been produced by The Baker-Raulang Co. Printed in color on 14 x 22 in. sheets, the posters are done in a bold cartoon style which makes them easy to read at a distance and while moving. The tag-line, "Be Smart—Be Safe," appears on each poster. The complete set, mailed ready for mounting on company bulletin boards or any wall, will be sent to anyone requesting it.

Circle 327 on Service Card, Page 35

Warehousing Survey

DTA has published further results of its recent survey of public warehousing by issuing a brief report showing the use of materials handling equipment in public general merchandise warehouses and providing a break-down of manpower required.

Circle 328 on Service Card, Page 35

Channels and Fittings

A 44-page catalog published by Flexa Steel Products, manufacturers of all-steel adjustable framing, gives basic information of Flexa's line of channels and fittings. It includes drawings and engineering data.

Circle 329 on Service Card, Page 35

Industrial Elevators

Bulletin 5211 presents the complete line of Barrett industrial elevators and portable cranes. The 36-page brochure shows hand and electrically operated portable elevators. Other elevators described include pallet, barrel, drum dumping, platform loading and balcony, revolving base, four-post and floor-to-floor.

Circle 330 on Service Card, Page 35

Ram and Fork Trucks

Heavy-duty Ram and Fork Trucks, with capacities from 12,000 to 60,000 lb, are the subject of a new brochure released by Elwell-Parker Electric Co. Detailed descriptions of 11 models and nearly a dozen action photographs showing these handling giants in action transporting coils and sheet steel are contained in the brochure.

Circle 331 on Service Card, Page 35

Coupling or Converter

To help both the user and manufacturer of powered equipment to better understand the application of hydraulic couplings and torque converters, Twin Disc Clutch Company has released a 32-page special issue of Production Road, titled "Coupling or Converter?"

Circle 332 on Service Card, Page 35

Flight Plan

United Air Lines has recently released a 35-page booklet, "United Mainliner Flight Plan," describing with numerous pictures and graphs the complete story behind their air service.

Circle 333 on Service Card, Page 35

Casters and Wheels Catalog

Buffalo Caster and Wheel Corp. recently announced a new 16-page catalog covering their entire line of industrial casters and wheels.

Circle 334 on Service Card, Page 35

FILMS

Safety Saves

A new training and safety film for industrial truck operators has been produced by Clark Equipment Co. The 30-minute sound movie, "Safety Saves," was filmed on on-the-job factory and warehouse locations. It dramatically illustrates the do's and don'ts of safe driving and shows the cause of most accidents and how to avoid them.

Circle 335 on Service Card, Page 35

Fork Trucks, Floor Crane

A 12-page manual illustrating its entire line of platform and fork trucks and floor cranes is available from Elwell-Parker Electric Co.

Circle 336 on Service Card, Page 35

Furniture Vans

Gerstenslager Co. has issued a 90-page catalog describing and illustrating construction details and various designs of furniture vans.

Circle 337 on Service Card, Page 35

Adjustable Docks

A new bulletin describing its line of Adjust-A-Docks and Adjust-A-Trucks has been issued by Rowe Methods, Inc. Both units are designed to increase handling efficiency on shipping and receiving docks.

Circle 338 on Service Card, Page 35

Shell Rimula Oil

Shell Oil Co. has prepared a new booklet, Shell Rimula Oil, explaining the advantages of its product in low temperature, intermittent engine operation. This oil, especially useful in industrial trucks, is claimed to reduce exhaust smoking, oil screen plugging, crankcase and valve chamber sludge, sticking valves and plugged oil rings, and rapid wear of critical moving parts.

Circle 339 on Service Card, Page 35

Educational Comic Books

An educational comic book showing that productivity is the key to America's prosperity is announced as the fifth in a series of similar booklets sponsored by Bemis Bro. Bag Co.

Circle 340 on Service Card, Page 35

Airtube System

Lamson Corporation, has issued a new 50-page booklet titled, "On Target." This booklet pictures and describes many uses for Lamson Airtube systems in modern industry and commercial enterprise.

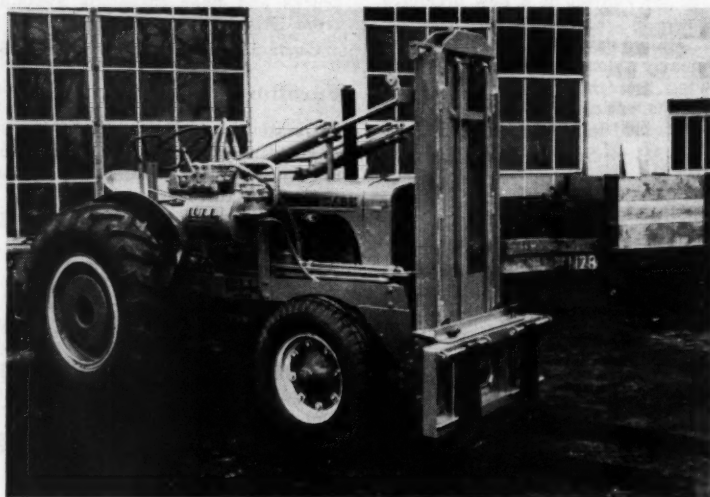
Circle 341 on Service Card, Page 35

(Please Turn to Page 102)

DA *New* PRODUCTS

FOR FURTHER INFORMATION USE READERS' SERVICE

Loader Features Tilting Tower, 10 Attachments



Claimed highly effective for materials handling in snow, mud and rough terrain, the Baker-Lull Universal Loader combines a tilting tower with 10 handling attachments.

The Loader is available in three models—2500, 4000 and 6000-lb capacities—and mounts on four national makes of industrial tractors. Large, high flotation pneumatic tires, high underclearance and axle oscillation on industrial tractors, combined with low center of gravity and sufficient power and weight for maximum traction permit operation of the loader under extreme conditions of mud, snow and uneven ground.

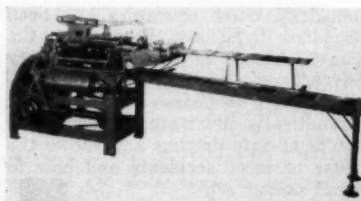
Among features is a tilting tower design. In forward-tilt position, more efficiency is gained in digging and dumping, loading and unloading. Using backward-tilt, a capacity

load is more effectively balanced and spillage is eliminated. Double-acting hydraulic cylinders tilt the tower 20 deg forward and 9 deg to the rear of center. Lifting height of largest model is 100 in.—higher lifts are optional.

Circle 367 on Service Card, Page 35

Wrapping Units

Hayssen Mfg. Co. has introduced two new models in their line of wrapping machines, the CUF Bacon Wrapping Machine and the Bread Slicing and Wrapping Machine.

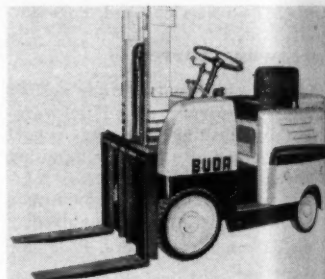


The bacon wrapping machine shown makes a uniform package with ample product visibility and space for painted design. The machine uses cellophane, pliofilm or heat sealing acetate. It wraps 1/2, 1-lb and other flat packages. An electric eye assures perfect registration for printed wrappers on all sides.

The bread wrapping machine was designed for military use, with special attention given to a well wrapped, securely sealed package of evenly sliced bread. It is available for civilian purchase.

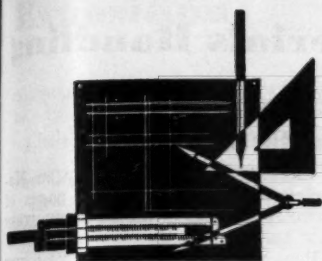
Circle 368 on Service Card, Page 35

5,000-lb Fork Trucks



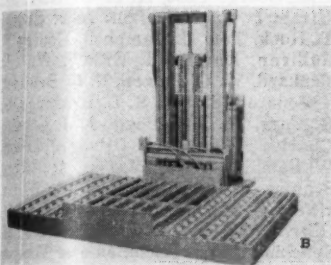
Development of the new 5000-lb capacity Models FTD50-24 diesel-powered, and FT50-24 gasoline-powered Fork Lift Trucks has been announced by The Buda Co. The FTD50-24 is powered by a Buda precision-built heavy duty industrial type Model 48D-182 Buda diesel engine. and Model FT50-24 is powered by a Buda 4B-182 heavy-duty gasoline engine. These trucks are rated 5000-lb capacity at 24-in. load center from heel to the forks. They are available in all standard heights of lift of 72, 84, 108, 114 and 120 in.

Circle 369 on Service Card, Page 35



CARD....PAGE 35

Roller Platform



Lewis-Shepard has designed a hydraulically operated roller platform for use with its Master JackStacker. Built to handle unwieldy boxes of stainless steel or aluminum from truck to storage, the four-way roller platform allows one man to complete the operation. Actuated either from the control handle or a button on the carriage frame, it engages the packaged steel in the vertical position by means of a steel plate and rotates it to a horizontal position. The attachment is removable and standard forks are substituted.

Circle 370 on Service Card, Page 35

Hydraulic Load Stabilizer

An Hydraulic-Powered Load Stabilizer, an attachment for fork trucks with capacities up to 6,000 lb, has been introduced by Elwell-Parker Electric Co. The unit is specially designed for safe transporta-

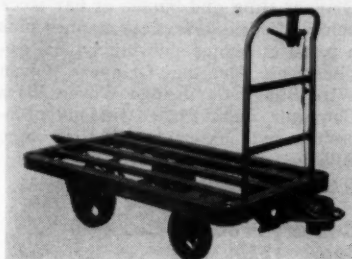


tion of unstable and semi-stable loads; it is also designated for stable loads which are subject to rough travel. Fork trucks, which accommodate the Stabilizer, are standard vehicles; the only alteration is to the hydraulic system to regulate the operation of the attachment. The shape or size of the Stabilizer plate may be altered to meet specific loads. Usually, the plate is faced with steel although it may be faced with rubber or wire mesh if desired.

Circle 371 on Service Card, Page 35

Combination Truck-Trailer

Mercury Co. announces production of a new type combination hand truck-trailer, with a 4000-lb capacity, designed to handle palletized loads. Model A-310-326M is an all-steel, caster-steer trailer equipped with a simple brake mechanism designed to permit easy manual control of the hand truck and load when operating on grades.



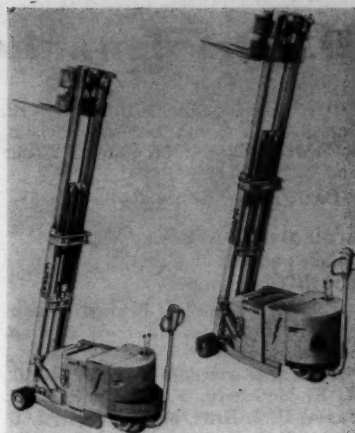
Flush deck construction of the unit makes it especially suitable for hauling pallet loads of materials.

The trailer brakes are of the external contracting type. Safety Self Couplers at each end of the unit equip it for trailer duty in Trackless - Train operations. The standard model is 36 in. wide by 62 in. long and the flush deck is 13 in. from the floor.

Circle 372 on Service Card, Page 35

Tilting Fork Stacker

The latest addition to the Powrworker line of Clark Industrial Trucks is the Telescopic Tilting Fork Stacker in four base capacities of 1500 lb, 2000 lb, 2500 lb, and 3000 lb, all rated at 24-in. center line of load. Two standard models are offered, one has an

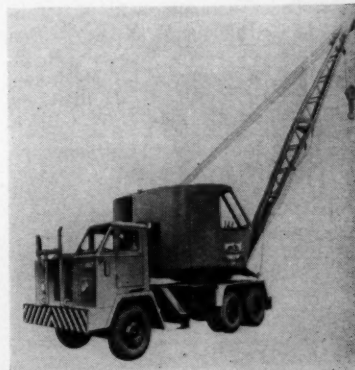


88-in. overall height with 64 in. of free lift and 130-in. maximum lift. The other, especially designed for highway truck loading, has a 68-in. overall height with 49 in. free lift and a maximum lift of 100 in. Lifting speeds vary from 21 to 14-ft per min, depending on load.

Circle 373 on Service Card, Page 35

Truck-Mounted Shovel

A new, heavy-duty truck-mounted shovel-crane, providing 20% more lifting capacity than previous Bantam models, has been announced by the Schield Bantam Co. Claimed to provide 6-ton capacity, the new $\frac{3}{8}$ -yd Model T-35 has greater operator visibility for ordinary work and hinged metal door on top of the cab. A complete line of matching attachments, including shovel, clam-shell, dragline, back hoe, magnet, wood grapple and pile driver is available.



Circle 374 on Service Card, Page 35

DA Previews the Fifth National Materials Handling

Personnel attending—R. M. Jaccard, James J. Law, Jr., James Peterman, R. E. Jaccard, A. J. MacRae, O. Bauer and C. Rinehart.

Circle 95 on Service Card, Page 35

Brainard Steel Div., Sharon Steel Corp. Booth 621

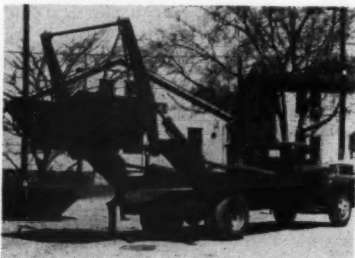
Exhibit—Complete Brainard Strapping System, also all tools and accessories.

Personnel attending—F. E. Houck, R. K. McCreery, F. J. Byrne, R. U. Sager, H. J. Britt, M. D. Rector, J. D. Boyer, P. D. Truog, and L. J. Daurelle.

Circle 96 on Service Card, Page 35

Brooks Equipment & Mfg. Co. Booth 1026

Exhibit—The Brooks Load Lugger, a truck mounted hydraulic hoist with multiple detachable bodies.



Personnel attending—David S. Price and C. Roy Keys.

Circle 97 on Service Card, Page 35

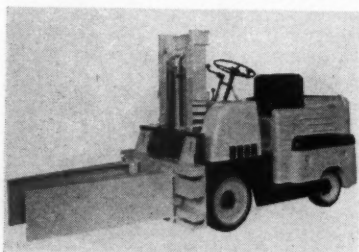
Brown-Line Corp. Booth 528

Circle 98 on Service Card, Page 35

The Buda Co. Booths 202-1425

Exhibit—Demonstration of complete line of new fork lift trucks, industrial tractors, both diesel and gasoline powered. Many of the tractors and equipment will be equipped with torque converters.

Personnel attending—R. K. Mang, L. C. Daniels, R. M. Scott, Don Kuthe, F. Schuster, T. Kush, H. H. Cohenour, R. Lunn, F. J. McMahon, Jr., Carl G. Meyer, C. J. Buettner, J. R. Reichert, C. Leete, L. W. Cultice.



Circle 99 on Service Card, Page 35

Burrows Equipment Co. Booth 237

Circle 100 on Service Card, Page 35

The E. W. Buschman Co. Booths 319, 321

Circle 101 on Service Card, Page 35

Butler Bin Co. Booth 825

Circle 102 on Service Card, Page 35

C. & D. Batteries, Inc. Booth 432

Exhibit—Several motorized lift truck batteries and industrial truck batteries.

Circle 103 on Service Card, Page 35

Calabar Corp. Booth 529

Exhibit—Con-L-Duit Safety Enclosure System and the Calabar Fluid Tractor, newest Con-L-Duit Safety Enclosure.

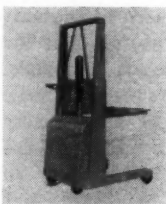
Circle 104 on Service Card, Page 35

Cambridge Wire Cloth Co.

Exhibit—A moving display of hoist Gripper sling and bundle of bar stock being lifted in a vertical manner plus a panel of photos showing typical applications for the Gripper Woven Wire Sling. Cambridge Woven Wire Conveyor Belts for continuous processing and materials handling also will be featured.

Circle 105 on Service Card, Page 35

Century Products Co. Booth 1823



Exhibit—Featuring Century 1000 and 1000-E Lift Trucks, available in elevating heights ranging from 4, 5 and 6 ft, with manual hydraulic lift, or electric hydraulic lift.

Personnel attending—R. A. Penney and R. E. Clemens.

Circle 106 on Service Card, Page 35

Chain Belt Co. Booth 1812

Circle 125 on Service Card, Page 35

Chicago Pneumatic Tool Co. Booth 1839

Circle 107 on Service Card, Page 35

Chicago Tramrail Corp. Booth 333

Exhibit— $\frac{1}{4}$ scale working model of a complete Selective Storage System, featuring Stak Rak Crane as well as Storage Racks.

Circle 108 on Service Card, Page 35

Chilton Co. Booths 239-241

Exhibit—Editorial display on Materials Handling from the pages of AUTOMOTIVE INDUSTRIES, DISTRIBUTION AGE and IRON AGE.

Personnel attending—AUTOMOTIVE INDUSTRIES: G. C. Buzby, James R. Custer, Paul C. Kennedy, H. H. Roberts, W. Thomas MacNew, Andrew W. Shearer, Nelson W. Sieber, E. E. Elder, Jack C. Hildreth, John F. Pfeffer, C. W. Hevner; DISTRIBUTION AGE: Robert E. McKenna, A. W. Greene, William A. Barbour, Floyd H. Hopkins, George Post, H. S. Webster, Jr., Hiram L. Roberts; IRON AGE: George T. Hook, Tom C. Campbell, George F. Sullivan, Darwyn I. Brown, Wm. V. Packard, W. G. Patton, E. C. Beaudet, Theodore Metaxas, R. L. Hatschek, G. G. Carr, E. C. Kellogg, J. J. Obrzut, Charles R. Lippold, Oliver Johnson, William M. Coffey, James A. Critch, Stanley J. Smith, Robert W. Watts, Harry G. Mumm, Peirce Lewis, C. H. Ober, C. T. Post, B. L. Herman, J. M. Spackman, Paul Bachman and Thomas H. Barry.

Circle 131 on Service Card, Page 35

Chisholm-Moore Hoist Corp. Booth 1526

Circle 109 on Service Card, Page 35

Christensen Sales Corp. Booth 1809

Exhibit—Plan to feature 4-Way Adjustable Hydraulic Loading Ramp, the Floating Dock and Easyload Transfer Plates.

Circle 110 on Service Card, Page 35

C. I. T. Corporation Booth 913

Exhibit—Executive sales personnel will be available for consultations with buyers and sellers of material handling equipment.

Circle 111 on Service Card, Page 35

The City Machine & Wheel Co. Booth 1542

Exhibit—Rubber tired wheels and casters for materials handling equipment.

Circle 112 on Service Card, Page 35

Clark Door Co., Inc. Booth 141

Exhibit—Operating display of three models of Pres-O-Matic Industrial Door Unit.

Circle 113 on Service Card, Page 35

Clark Equipment Co., Ind. Truck Div. Booths A, B, 1600

Exhibit—X-70 "Fork Truck of Future" and 20 other new pieces of

Exposition

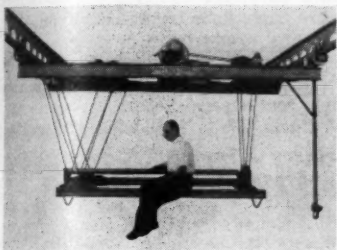
equipment with gas, electric, Diesel and LP gas power units.

Circle 114 on Service Card, Page 35

The Cleveland Crane & Engineering Co. Booth 1325-A

Exhibit—Motor-operated crane and a hand-propelled crane running on separate runways, also a stabilized crane will be in operation. The new Saf-Powr-Bar safety type electrification, which prevents accidental contact with an electrified conductor bar, will be shown.

Personnel attending—H. T. Florence, A. F. Anjeskey, C. L. Peterson, K. R. Weise, R. S. Forestal, Alfred Huntington, H. P. Hanks, A. E. Creasy, H. P. Haggett, A. E. Carl, C. V. Berge and F. W. Everard.



Circle 115 on Service Card, Page 35

Clinch-Tite Pallet Co. Booth 336

Exhibit—Clinch-Tite Pallets, all nails clinched on the center line of the stringers, providing a positive fastening for top and bottom boards.

Circle 116 on Service Card, Page 35

Clyde Iron Works, Inc. Booth 312

Exhibit—Working model of an Unloader and Builder's Tower.

Circle 117 on Service Card, Page 35

Coffing Hoist Co. Booth 407

Circle 118 on Service Card, Page 35

Coles Cranes, Inc. Booth 1333-B



Circle 119 on Service Card, Page 35

The Colson Corp. Booth 1239

Circle 120 on Service Card, Page 35

(Continued from Page 24)

Colson Equipment & Supply Co. Booth 837

Circle 121 on Service Card, Page 35

Conco Engineering Works Booth 1402

Exhibit—Jib Cranes and type "SD" Electric Trolley Hoist.

Circle 122 on Service Card, Page 35

Continental-Diamond-Fibre Co. Booth 132

Circle 123 on Service Card, Page 35

Continental Motors Corp. Booth 1250-A

Circle 124 on Service Card, Page 35

Conveyor Specialty Co., Inc. Booth 1110

Exhibit—Introducing the "Series L" Unitized Belt Conveyors. These are standard stock units (drives, take-ups, intermediate sections) that are easily assembled in various combinations to meet individual needs.

Circle 126 on Service Card, Page 35

Crescent Metal Products, Inc. Booth 404

Circle 127 on Service Card, Page 35

Cushman Motor Works, Inc. Booth 145

Circle 128 on Service Card, Page 35

Dearborn Motors Corp. Booth 1820

Circle 129 on Service Card, Page 35

Dempster Brothers, Inc. Booths 133-135-137-139

Exhibit—Operating scale models of the DEMPSTER-DUMPSTER Type LFW, the DEMPSTER-BALESTER and will feature, for the first time, a model of the DEMPSTER-DUMPSTER Type DTLF.

Circle 130 on Service Card, Page 35

Detecto Scales, Inc. Booth 340

Circle 132 on Service Card, Page 35

Dico Co. Booth 1800

Circle 133 on Service Card, Page 35

Dings Magnetic Separator Co. Booth 414

Circle 134 on Service Card, Page 35

Divine Brothers Co. Booth 415

Exhibit—Industrial truck caster and wheels.

Circle 135 on Service Card, Page 35

Charles William Doepke Mfg. Co. Booth 714

Exhibit—"Nes-Tier" shop box and the "Nes-Tier" System of small parts handling.



Personnel attending — Charles Doepke, Frederick Doepke, William Portman.

Circle 136 on Service Card, Page 35

Doerr Electric Corp. Booth 609

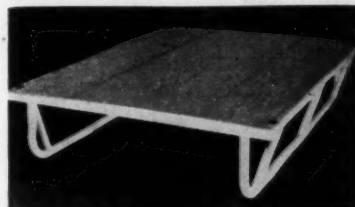
Circle 137 on Service Card, Page 35

Drake, Startzman, Sheahan and Barclay Booths 814

Circle 138 on Service Card, Page 35

Econoweld Corp. Booth 1831

Exhibit—New models of Econoweld pallets and skids especially useful for stacking, storage on racks, conveyor use, high floor clearance, a reversible model (two decks) and a new divider board.



Circle 139 on Service Card, Page 35

Edison Storage Battery Division Thomas A. Edison, Inc. Booths 240-244-341-345

Circle 140 on Service Card, Page 35

Elberta Crate & Box Co. Booth 918

Exhibit—Industrial wirebound packages.

Circle 141 on Service Card, Page 35

The Electric Products Company Booth 1416

Exhibit—Vertical-type motor-generator, four circuit motor-generator battery charger, single-circuit Type S charger, dual-circuit sectionalized panel for charging twelve large industrial truck batteries simultaneously, charging panel consisting of motor-generator control section.

Circle 142 on Service Card, Page 35

The Electric Storage Battery Co. Booth 1549

Exhibit—New T-H Exide Ironclad battery and many other types.

Circle 143 on Service Card, Page 35
(Please Turn Page)

... Handling Exposition

(Continued from Preceding Page)

Elizabeth Iron Works Booths 1145-1147

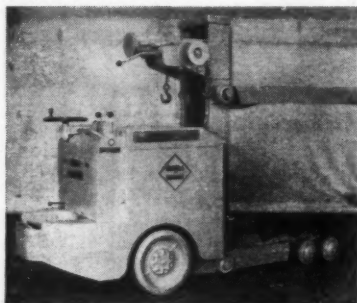
Exhibit—All-steel materials handling equipment, including their newest product "Dubl-Duty" Pallet Stacker Conversion Kit which permits any standard wood pallet to be changed into a tiering pallet for safe storage of crushable, fragile or irregular-shaped merchandise. The Multi-Stak, capacity 4,000 lb, will be demonstrated under actual warehousing conditions.

Circle 144 on Service Card, Page 35

The Elwell-Parker Electric Co. Booths 1134-1233

Exhibit—Display and operation of a variety of industrial trucks including the new model F-38T 2,000-lb capacity truck. Demonstrations of roll paper handling, pallet handling, and other material will show adaptability of trucks. Several cut-away models of industrial truck assemblies will permit visual inspection of construction and workmanship details not otherwise visible. Color slides will illustrate field installations and use of their trucks.

Personnel attending—W. A. Meddick, J. A. Holan, D. T. Noyes, L. C. Hopper, J. A. Draxler, J. A. Ackerman.



Circle 145 on Service Card, Page 35

The Elwing Corp. Booth 830

Circle 146 on Service Card, Page 35

A. H. Emery Co. Booth 304

Circle 147 on Service Card, Page 35

William F. Endress, Inc. Booth 1825

Circle 148 on Service Card, Page 35

Engineering Research Associates, Inc. Booth 411

Circle 149 on Service Card, Page 35

Equipment Mfg. Co. Booth 1005



ing and assembly features of the equipment—portable stock racks, pallet racks, coil racks, scrap boxes, and wire mesh boxes.

Circle 150 on Service Card, Page 35

Equipto Division, Aurora Equipment Co. Booth 802

Circle 151 on Service Card, Page 35

Evans Products Co. Booth 1829

Exhibit—Featuring the Evans DF Loader.

Personnel attending—W. G. Webb, E. W. Peterson, W. Thomas, R. Tobin, H. Cooper, S. Hudson and D. Olson.

Circle 152 on Service Card, Page 35

Fab-Weld Corp. Booths 1505-1548

Exhibit—Floating Hub Trailer, 4,000 lb capacity, 10,000 lb Capacity Trailer, Square Tube Stackable Pallet, Collapsible Stacking Pallet, Bar Racks, Drop Bottom Hopper, and 16,000 lb Caster Steel Trailer.



Circle 153 on Service Card, Page 35

The Fairbanks Co. Booth 520



Exhibit—Representative samples of two wheel and platform hand trucks, casters, wheels, valves and unions. The feature of the display will be their caster lines, namely the "Lockweld" steel casters without a kingpin in both the single and double ball race styles and a new series

"27" heavy duty double ball race caster which uses a large outer ball raceway and a Timken thrust bearing at the kingbolt.

Personnel attending—E. T. Flanagan, C. E. Thyng, A. T. Wendler, W. F. Guthrie, P. M. Fallon, J. J. Langan, W. R. Bieretz, H. S. Jones, W. J. Kaiser, Jr., I. C. Massagli, H. J. Knapp, E. T. Zittel, L. M. Nellenger, C. W. Freeman.

Circle 154 on Service Card, Page 35

Arthur C. Farley & Co. Booth 437

Circle 155 on Service Card, Page 35

A. B. Farquhar Co., a Subsidiary of The Oliver Corp. Booth 925

Circle 156 on Service Card, Page 35

Faultless Caster Corp. Booths 228-232

Exhibit—General line of industrial and furniture casters, glides, furniture cups, floor truck locks, and other general products.

Personnel attending—Clarence B. Noelting, J. R. Stallings, Sam Whiteley, and several others.

Circle 157 on Service Card, Page 35

Harry J. Ferguson Co. Booths 421-322

Exhibit—"Streamliner" Conveyors: Slat Conveyor, Live Roller Conveyor, Power Roller Curve, Portable Belt Booster, Gravity Conveyors.

Personnel attending—Harry J. Ferguson, Harry J. Ferguson, Jr., William H. Roth, Ernest O. Frey, J. Richard Butler.

Circle 158 on Service Card, Page 35

Fibre Specialty Mfg. Co. Booth 440

Exhibit—Handling equipment made from genuine hard vulcanized fibre, also, new "Fiberglas" reinforced plastic trays and tote boxes made by the metal die molded process.

Personnel attending—R. A. Craig, Ralph Woods, R. F. Mancill, G. H. Ingram, C. C. Hannum, M. C. Seldomridge, and Layton S. Allen.

Circle 159 on Service Card, Page 35

Flexa-Steel Products, Inc. Booths 509, 511

Circle 160 on Service Card, Page 35

Foot Bros. Gear & Machine Co. Booths 119-121

Circle 161 on Service Card, Page 35

Ford Motor Co., Tractor and Industrial Engine Division Booth 1821

Exhibit—Six Ford industrial engines, "215," "239," "254," "279," "317" and the new "131" replacing the "120."

Personnel attending—J. F. Bachman, R. S. Martin, B. M. Harrison and L. E. Henn.

Circle 162 on Service Card, Page 35

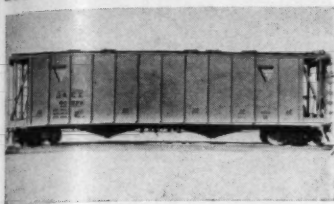
Fungitrol Chemicals, Inc. Booth 417

Circle 163 on Service Card, Page 35

The Garlock Packing Co.
Booth 1545

Circle 164 on Service Card, Page 35

General American Transportation Co.
Booth RR Siding



Exhibit—Airlide car, a new type of special covered hopper car, will be located at track exhibition space.

Personnel attending—Paul Talmey, E. R. Aller, John M. Gleason and William M. Roche.

Circle 165 on Service Card, Page 35

General Box Co.
Booth 122

Circle 166 on Service Card, Page 35

General Electric Co., Apparatus Div.

Booths 708-710

Circle 167 on Service Card, Page 35

General Electric Co., Electronics Div.

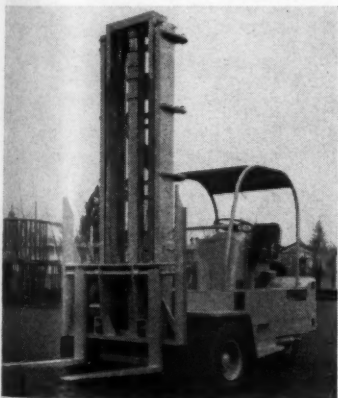
Booth 801

Circle 168 on Service Card, Page 35

Gerlinger Carrier Co.
Booths 1014-1018-1022

Exhibit—Gerlinger lift truck Model PH 962-130 and carrier Model SRH 5770, also new short wheel base lift truck Model S-15.

Personnel attending — Ray W. Gohrke, Harold G. Kraus, George C. Lichty and J. W. Kitzmiller.



Circle 169 on Service Card, Page 35

Gerotor May Corp.
Booth 917

Exhibit—Main exhibit will feature "PneuBin," a bin-feeding device made of B. F. Goodrich Amorite rubber or neoprene which prevents arching and funneling of material on the sides of bins and hoppers.

Circle 170 on Service Card, Page 35

A. J. Gerrard & Co.
Booth 306

Exhibit — Featuring the BULK-BINDER, a complete combination strapping unit for heavy-duty strapping in shipping, palletizing, carloading and bracing with a new type dispensing reel; also, the BELTBINDER UNIT, a complete light-weight strapping outfit that attaches to the waist, thus freeing both hands for safety and convenience; and other strapping equipment.

Personnel attending—Henry Wenk, G. D. Brennan, G. C. Brennan, G. C. McDuell, Robert Gorman, J. M. Gerrard, and Don F. Downing.

Circle 171 on Service Card, Page 35

Gleason Corp.
Booth 339



Exhibit — Industrial wheels, casters, hand and platform trucks.

Personnel attending — A. L. Kotler, E. H. Fine.

Circle 172 on Service Card, Page 35

The Globe Co., Grip-Strut Div.
Booth 828

Exhibit—Safety Grip-Strut, a new type of grated material for catwalks, stair treads, work platforms, mezzanines, running boards, radiator grills, etc.

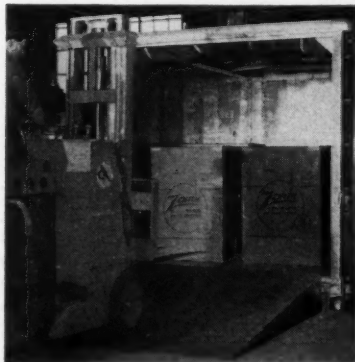
Personnel attending—R. L. Gambill, J. A. Hunt, Ed Stokes, E. G. Artz, Dick Artz, Joe Hunt and H. M. Donnelly.

Circle 173 on Service Card, Page 35

Globe Hoist Co.
Booths 1252-1254

Exhibit—Working models of the Globe Self-Leveling Ramp and the Globe Production Lift for machine feeding, displays covering Bridge Lifts, Loading Lifts and other applications of hydraulic platform lifts for lifting, loading, positioning and materials handling operations.

Personnel attending—Carl E. Duckwitz, J. Marshall Harlan, Robert Porter, William Eister, and E. E. Hussey.



Circle 174 on Service Card, Page 35

B. F. Goodrich Co.
Booths 104-205

Circle 175 on Service Card, Page 35

Gould-National Batteries, Inc.
Booths 335-337

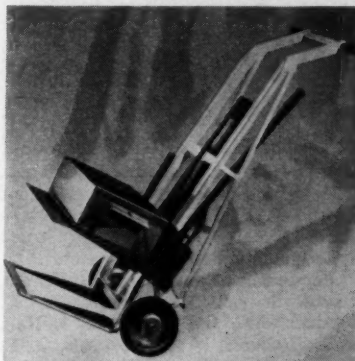
Exhibit—Standard display of batteries applied to this market and in addition, will display "peep" show comprised of three-dimension colored slides on battery research program.

Circle 176 on Service Card, Page 35

Grand Specialties Co.
Booth 101

Exhibit — Material Elevator and Hydraulic Dumping unit. Shop Caddies, LiftStackers and the new Appliance Caddy recently developed.

Personnel attending—A. M. Sasgen, Wm. T. Bardouski, Fred P. Hopfeld, Gene Kreml, Jim Mayer, G. C. Hyatt, A. Marthens and A. L. Neyens.



Circle 177 on Service Card, Page 35

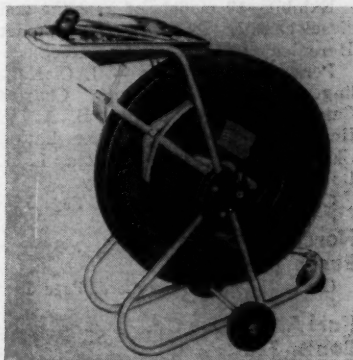
Guilbert, Inc.
Booth 1837

Circle 178 on Service Card, Page 35

H. G. Hanline Co.
Booth 412

Exhibit—Allegheny Steel Band Co. line of steel strapping, strapping tools, seals and accessories, for banding packages, bales, boxes, bundles, pallets and carloads.

Personnel attending—Jay Bowman, L. J. Frey, Jack W. Dunbar, R. F. Tettemer, William F. Kiesel, Jr., William Hall, and William Malseed.



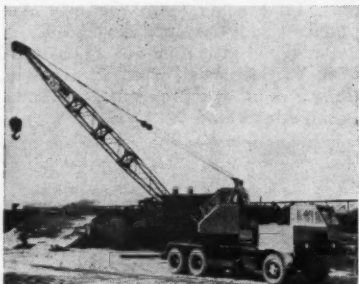
Circle 179 on Service Card, Page 35
(Please Turn Page)

... Handling Exposition

(Continued from Preceding Page)

Harnischfeger Corp. Booths 1509-1513-1515

Exhibit — Newly built operating scale model of an Overhead Traveling Crane which can be operated as a magnet, or with bucket or hook attachment. A cutaway section of a Hevi-Lift Hoist and the latest improved Zip-Lift Hoist in operation will also be featured. The Welder Division will display the new DC-200 amp. Rectifier Welder along with the TH-200 amp. Standard Welder and



the new Electrode Maintenance Pack. The newest and latest development in the P&H line of excavators—the P&H Model 55 "Miti-Mite" truck crane mounted on a P&H carrier.

Personnel attending—F. M. Blum, Curtis Meyer, F. Hirner, S. W. Trainer, W. O'Malley, W. McNeil, J. E. Roberts, F. C. Edwards, J. E. Padgett, Burt Thorpe, M. O. Monsler, P. C. Petry, H. Harnischfeger, and B. Pratte.

Circle 180 on Service Card, Page 35

Haslett Chute & Conveyor Co. Booth 418

Exhibit—Spiral Package Chute and GEE-VEE-LINE conveyors.

Personnel attending—Franklyn W. Wagner, Maurice T. White, E. A. Normann, Donald W. Holman, Charles W. Bothwell, Jr., Gerald R. Guest, David A. Bollinger.

Circle 181 on Service Card, Page 35

Hercules Motors Corp. Booths 1813-1815-1817-1819

Exhibit—17 models of gasoline and diesel engines, featuring the compact Hercules 4 and 6 cylinder diesel.

Personnel attending — J. C. Kep-linger, T. S. Klinedinst, Charles Balough, G. W. LaSalle, E. A. V. Horiak, Robert Bow, Walter Ratke, Charles Collins, D. W. Latta, L. J. Downey, and John Mahoney.

Circle 182 on Service Card, Page 35

Hercules Flooring Co. Booth 829

Circle 183 on Service Card, Page 35

Karl A. Herman Co. Booth 328

Exhibit — Featuring the Leitelt Twin Screw and Hydraulic Dock

Boards as well as new Herco 4-Way Adjustable Loading Dock with full scale models on display on boards.

Circle 184 on Service Card, Page 35

The Hertner Electric Co. Booths 1400-1401

Circle 185 on Service Card, Page 35

Fred Hill & Son Co. Booths 808-810

Exhibit—This distributor plans to feature the completeness of their stocks of standard MH equipment and the extent of their special services.

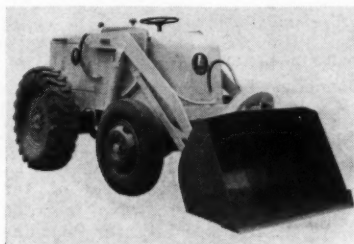
Personnel attending — Kenneth Shaw, William W. Ford, Sr., William Mann, Thomas Shaw, Lindley Cowperthwait, Jack Curry, Jack Keating, Ben Graff, Jr., Ed White, and Frank White.

Circle 186 on Service Card, Page 35

The Frank G. Hough Co. Booth 1349

Exhibit—Models HA, HAH, HE, HF, HR and HM "PAYLOADERS" and the Model TM "PAYLOADER" Tractor.

Personnel attending—Raymond P. Wiggers, G. A. Gilbertson, H. E. Thomas, G. A. Tamblyn, R. W. Lewis, and C. W. Tuohey.



Circle 187 on Service Card, Page 35

Jacob House & Sons Booth 826

Circle 188 on Service Card, Page 35

The Howe Scale Co. Booth 536

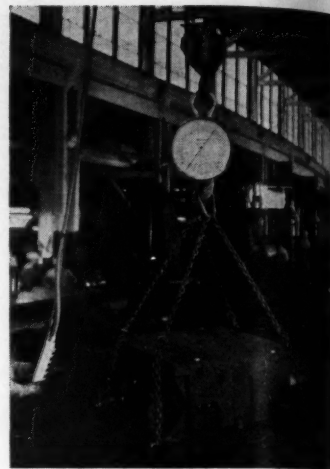
Circle 189 on Service Card, Page 35

Philip V. Hugues & Sons Booths 513-515

Circle 190 on Service Card, Page 35

Hydroway Scales, Inc. Booth 637

Exhibit — The company's line of "Hydroscale," hydraulic crane scales will be displayed in various capacities and dial sizes, including a tilt face dial for high level reading and the new pound-kilogram scale. Also, a new batching scale which is being made available in 500 and 1000 lb sizes will be displayed.

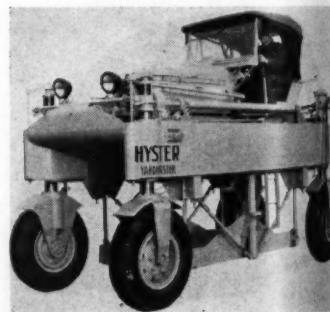


Personnel attending—W. Wise, L. Wise, A. Caille, J. Davis, E. J. Henk, T. W. Smitthausler.

Circle 191 on Service Card, Page 35

Hyster Co. Booths 1206-1305

Exhibit—Four new lift truck models YC-40, UC-30, XA-60 and ZA-80 will be displayed for the first time along with several improved models and attachments. The YC-40 is claimed to be the smallest and lightest 4,000 lb lift truck on the market; the UC-30 is a 3,000 lb capacity version of the YC-40. The new ZA-80 is an 8,000 lb capacity model while the XA-60 is a heavy-duty version of the ZA-80. Both were designed small and compact, so that they can be used efficiently on many jobs found both inside and outside. Other trucks to be shown are



the QN-20 Lift Truck with the exclusive three-piece detachable counterweight feature; the QN-20 Free Lift Model; the YT-40; the RT-150; a Karry Krane; Straddle Truck and several models of Turret Trucks. Among the attachments to be shown are the Load Grab with revolving load arms.

Personnel attending—Ernest G. Swigert, Harvey Black, Eugene Caldwell, Philip S. Hill, Dar Johnson, and Thor Pearson.

Circle 192 on Service Card, Page 35

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Ideal Stencil Machine Co.
Booth 525

Exhibit—Improved Ideal Automatic Stencil Cutting Machines, Handy Fountain Stencil Brushes, Ideal Fountain Markers and supplies. The Ideal Clip-A-Tape Dispensers, both hand and electric models, will also be demonstrated. Ideal Handy Printer attachment for code-marking gummed tape will be on display.

Personnel attending—R. F. Alexander, R. F. Alexander, Jr., Edward McDonald, Edward Ryan, and Edward Paul.

Circle 193 on Service Card, Page 35

Industrial Truck Association
Booth 737

Circle 194 on Service Card, Page 35

International Staple & Mach. Co.
Booths 422-426

Exhibit—Featuring Models TVH1, controlled by foot switch; HPA, pneumatically operated; HM, portable, manually operated; Boxer, operating on the retractable anvil principle—stapling filled corrugated or fibre cartons from the outside; and C2E, designed for closing of center slotted cartons, tops and bottoms simultaneously from the outside, after packed.

Personnel attending — Philip C. Cooke, E. A. Woodcock, Vincent Zike, Paul F. Busch, Ernest McConnell, Paul J. Crawford, Syd M. Lerner, and Ray E. Eilenfeldt.

Circle 195 on Service Card, Page 35

Ironbound Box & Lumber Co.
Booth 720

Circle 196 on Service Card, Page 35

The Jaeger Machine Co.
Booths 1802-1804-1806-1808

Circle 197 on Service Card, Page 35

The Joyce-Cridland Co.
Booths 308-310

Circle 198 on Service Card, Page 35

Kalamazoo Manufacturing Co.
Booths 1537-1539-1541

Exhibit — Speed Truck, Tractor, Xpediter.

Personnel attending—J. H. Tuttle, R. E. Keller, H. A. Robandt and P. E. Pettes.



Circle 199 on Service Card, Page 35

Truck-Man Division,
The Knickerbocker Co.
Booths 115-117

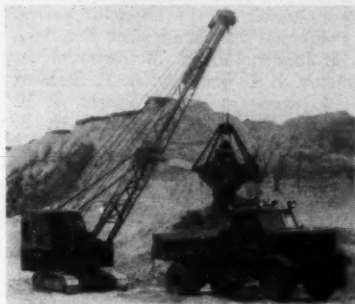
Circle 200 on Service Card, Page 35

Geo. Koch Sons
Booth 921

Circle 202 on Service Card, Page 35

Koehring Co.
Booths 1013-1017

Exhibit—Koehring 205 excavator and Kwik-Mix Moto-bug.



Circle 201 on Service Card, Page 35

Lamson Corp.
Booths 215-217-219

Exhibit—First time in actual operation the Automatic Pneumatic Tube Switch System along with a model conveyor which demonstrates seven different types of conveyors.

Personnel attending—C. F. Dietz, R. I. Hicks, V. C. Story, E. H. Woodberry, A. M. Brown, C. A. Burton, J. B. Ellor, G. D. Beaver, G. Kittredge, W. G. Lanterman, L. F. Hosley, K. F. Warner, A. J. Cole, M. W. Jaquier and M. N. Ripley.

Circle 203 on Service Card, Page 35

The Lanham Co.
Booth 349

Circle 204 on Service Card, Page 35

Lansing Co.
Booth 325

Circle 205 on Service Card, Page 35

G. B. Lewis Co.
Booths 1300-1302

Exhibit—Introduction of "Plexton" TOTE PANS to the Lewis line of industrial containers, made of reinforced Fiberglass in a variety of colors. Skid box, stacking box, box truck, masonite box truck, and folding box models will be demonstrated.

Circle 206 on Service Card, Page 35

Lewis-Shepard Products, Inc.
Booths 1134-1433



Exhibit—New and improved space saving materials handling trucks, including the Model "M," JackStacker high lift Walkie and low lift Walkie which operate in 6-ft aisle, Model "J" electric fork truck with 2000-lb capacity and Model "E."

Personnel attending—Howard M. Palmer, a group of division sales managers and other L-S representatives from the East.

Circle 207 on Service Card, Page 35

Lift Trucks, Inc.
Booths 1137-1139-1141

Circle 208 on Service Card, Page 35

Little Giant Products, Inc.
Booth 1805

Exhibit—New "Yard Bird" sweeper, designed to fit any fork lift truck.

Personnel attending—H. G. Sharp, and W. F. Crawford.

Circle 209 on Service Card, Page 35

The Loudon Machinery Co.
Booth 510

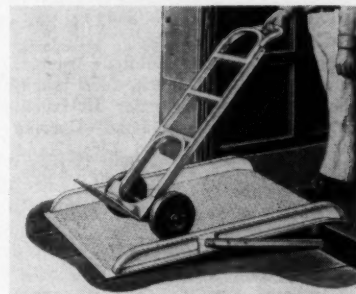
Exhibit — Feature an automatic slide projector showing Loudon Monorail equipment at work in plants covering the principal industrial classifications.

Personnel attending—Wilbur May, A. M. Rinehart, Brice Gamble.

Circle 210 on Service Card, Page 35

Magline, Inc.
Booth 604

Exhibit—Dockboards, hand trucks, safety tongs, safety blocks, barrel skids, platform trucks, mobile loading ramps, portable bridges.



Personnel attending—D. C. Law, R. V. Miller, F. A. Reger, G. C. Murray.

Circle 211 on Service Card, Page 35

Magne-Plastic Corp.
Booth 736

Circle 212 on Service Card, Page 35

Magnesium Co. of America
Booth 1126

Exhibit—Dockboards, ramp-dock-board combinations, roller conveyors, tote boxes, pallet dollies, hand trucks, blood plasma shipping containers and portable yard ramp.

Personnel attending—E. S. Christiansen, M. L. Abel, R. G. Robey, D. E. Harvey, W. Johansen, W. R. Gow, R. L. McKee, and J. B. Weil.

Circle 213 on Service Card, Page 35

(Please Turn Page)

... Handling Exposition

(Continued from Preceding Page)

Walter Maguire Co., Inc.

Booth 615

Circle 214 on Service Card, Page 35

Manning, Maxwell & Moore, Inc.

Booth 1406

Exhibit—Trolleys for various types of standard overhead electric traveling cranes. Series 700 "Load Lifter" Electric Hoist, "Budgit" Aluminum Chain Blocks, "Budgit" Portable Electric Hoists, "Tugit" Lever Operated Hoists, and other items.

Personnel attending—A. R. Walkley, C. E. Miller, G. A. Andree, L. H. Burch, F. S. Liechti, H. F. Morse, G. A. Mitchell.

Circle 215 on Service Card, Page 35

Mansaver Industries

Booth 1518

Circle 216 on Service Card, Page 35

Markem Machine Co.

Booth 112

Exhibit—Industrial marking machines in operation, showing typical applications of marking machines in the packaging field.

Personnel attending — Harold D. Milton, John H. Vigneault, Sumner W. Raymond, Robert Mensel, Joseph Lyons, John Kelen, Ed Kreft, and Ted Johnson.

Circle 217 on Service Card, Page 35

Market Forge Co.

Booths 234-236-238

Exhibit — Load-Mobile, Tractor, Freight truck, lift truck, fork truck, pallet truck and also a tier lift truck. Also, Load-Carriers, Load Carrier Junior, Loadveyor, Load Lift, Hand Pallet Load Lifts, all steel load skids, all steel semi-skids and jacks

Circle 218 on Service Card, Page 35

Marsh Stencil Machine Co.

Booth 824

Circle 219 on Service Card, Page 35

The Master Builders Co.

Booths 125-129

Circle 220 on Service Card, Page 35

The Material Handling Inst., Inc.

Booth 636

Exhibit—Literature pertaining to the Institute and material handling subjects, references to booklets dealing with the subject of material handling, etc.

Personnel attending—R. Kennedy Hanson, N. F. Young.

Circle 221 on Service Card, Page 35

Mathews Conveyor Company

Booths 632 and 733

Exhibit—A complete line of conveying equipment, the more spectacular system work being shown in enlarged photographs. Units of

standardized equipment will be displayed. Featured will be the new Mathews #4207 4 in. Trolley Conveyor, known as the Loadstar series.

Personnel attending—Lee Sekulski, L. J. Johnson, O. H. McCleary, J. A. Meister, J. A. Grandey, A. F. Richter, W. J. Ramsey, R. W. Sibole, J. R. Parkhill, P. W. Brown, and H. S. Winfield.

Circle 222 on Service Card, Page 35

May-Fran Engineering, Inc.

Booth 1301

Exhibit—Working models of the "Chip-Tote" Conveyor, "Little Hustler" Conveyor and Hinged-Steel Conveyor Belting.

Personnel attending—E. W. Franz, G. H. Meyfarth, Jr., W. A. Stühr, Jr., and H. E. Ziegler.

Circle 223 on Service Card, Page 35

Mechanical Handling Systems, Inc.

Booths 905-909

Exhibit — A mechanized exhibit, showing how its standardized conveyors will meet the needs of varying conditions. Commodities will move along a live roller conveyor onto a TRANSVEYOR with its powered horizontal belt. A sweep transfer will move the goods to a LIFTVEYOR, from which they will be automatically transferred to a JUNIOR MONO-VEYOR overhead trolley conveyor.



This will carry the commodities to an automatic transfer point. A section of ROLLERVEYOR and a section and corner of WHEELVEYOR return the goods by gravity to the start of the cycle again.

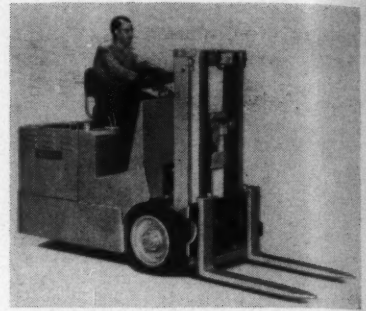
Personnel attending—S. C. Lloyd, Ralph Shelton, Joe O'Hara, Wil Johnson, Bill Wagner, E. W. Todd and Dan Roberts.

Circle 224 on Service Card, Page 35

The Mercury Mfg. Co.

Booth 1533

Exhibit—Three entirely new major products along with electric and gasoline industrial tractors, electric fork lift trucks and various types of industrial trailers: New "Yak" Model 430—4,000 lb capacity sit down battery electric fork truck; "Tug" electric tractor, designated as Model A-540-100; small "Banty" gasoline tractor, which will be available as either a three-wheel or four-wheel model.



Personnel attending—O. T. Henkle, Jr., A. E. Radcliffe, E. B. Forslund, Harry L. Strong, G. J. Gerhardt, H. E. Hemberg, L. F. Meissner, Jr.

Circle 225 on Service Card, Page 35

Michigan Crane & Conveyor Co.

Booths 501-505

Exhibit — Michigan Crane and "Man-O-Steel" Heat Treat Furnace Loader in conjunction with background display which will exploit immediate delivery and other important features.

Personnel attending—A. B. Bogle, L. N. Bogle and M. M. Gruich.



Circle 226 on Service Card, Page 35

Michna Systems

Booth 425

Circle 227 on Service Card, Page 35

Midwest Precision Corp.

Booth 1151

Circle 228 on Service Card, Page 35

Milwaukee Truck & Caster Corp.

Booth 339

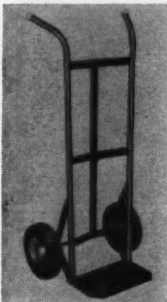


Exhibit — Industrial wheels, casters, hand and platform trucks, steel shelving and other material handling items.

Personnel — A. L. Kotler, E. H. Fine.

Circle 229 on Service Card, Page 35

DISTRIBUTION AGE

Mine Safety Appliance Co.**Booth 1827**

Circle 230 on Service Card, Page 35

Mobile Industrial Equip Co.**Booth 1816**

Circle 231 on Service Card, Page 35

Mobilift Corp.**Booths 1114-1116**

Circle 232 on Service Card, Page 35

Motor Generator Corp.**Booth 1245**

Circle 233 on Service Card, Page 35

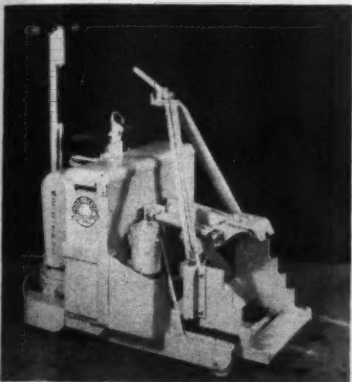
Motorola, Inc., Communications & Electronics Div.**Booth 1120**

Circle 234 on Service Card, Page 35

The Moto-Truc Company**Booths 902-1001**

Exhibit—One truck of each model with exhibition area set aside to show how each one of these models can be effectively used. Main feature—Bull dog Grip-All Tractor.

Personnel attending—I. F. Schreck, R. C. Heiser and Paul F. Schreck.



Circle 235 on Service Card, Page 35

National Light Metals & Plastic Co.**Booth 804**

Circle 236 on Service Card, Page 35

National Pallet Corp.**Booths 1100-1201**

Circle 237 on Service Card, Page 35

National Wooden Box Assoc.**Booths 1202-1204**

Exhibit—Actual material illustrating the steps in the commercial manufacture of nailed wooden boxes, crates and shooks, from log to box parts or set up boxes and crates. Also shown will be standard styles of nailed wooden boxes and crates and proper assembly and lidding of nailed wooden packages.

Personnel attending—C. D. Hudson, C. T. Cackley and Wm. E. Hughes.

Circle 238 on Service Card, Page 35

Nutting Truck & Caster Co.**Booth 1514**

Exhibit—Sales engineers to provide consultation services and literature

on their newest MH products.

Personnel attending—K. F. Heath, in charge of booth.

Circle 239 on Service Card, Page 35

Ohio Hoist & Mfg. Co.**Booth 1814**

Exhibit — "Bob-Cat" heavy duty electric hoist, Ohio Spur Geared and Differential Hoists, Stratton Hydraulic Cranes. Load Binders and Load Guards, and Drum Lifters.

Personnel attending—J. W. Dickey, A. J. Rinnander, K. R. Moffett, G. E. Campbell, D. E. Ehlenfeldt.

Circle 240 on Service Card, Page 35

Orangeville Mfg. Co.**Booth 410**

Exhibit—Hand trucks, both 2 and 4 wheel in all types of standard and special designs.

Personnel attending—L. C. Conner, John C. Conner, R. C. Megargell.

Circle 241 on Service Card, Page 35

Otis Elevator Co.**Booth 605**

Exhibit—Three-dimensional models will demonstrate various methods of vertical material handling. Exhibit will show how modern freight elevators—electric or hydraulic—can be designed to meet each user's specific material handling needs. Models of fork-lift trucks, pallet jacks, trailer-trains, roller conveyors and overhead monorails as well as elevators will be available at the exhibit to work out specific problems of vertical transportation. Various systems of elevator integration with other material handling equipment in specific plants will be worked out by Otis engineers at the show. The value of time-savers such as bi-parting, power operated doors, self-leveling and doors at each end of the elevator car will be illustrated.

Personnel attending—Howard Gotthardt will be in charge.

Circle 242 on Service Card, Page 35

Oxy-Catalyst, Inc.**Booth 922**

Exhibit — OCM catalytic exhaust system for gasoline powered equipment which eliminates carbon monoxide and exhaust odors almost entirely, plus other equipment.

Circle 243 on Service Card, Page 35

Pallett Devices, Div. Eberhardt Mfg. Co.**Booth 611**

Circle 244 on Service Card, Page 35

The Paltier Corp.**Booth 1544**

Exhibit—Storage and Warehouse systems such as Paltier, Pyramid Rack, Tiering Hardware for assembly to standard pallets.

Personnel attending—L. F. Skubie, S. E. Janus, Walter Nelson, J. H. Overpeck, W. S. Harlson, and R. M. Slife & Assoc.

Circle 245 on Service Card, Page 35

Parker Sweeper Co.**Booth 334**

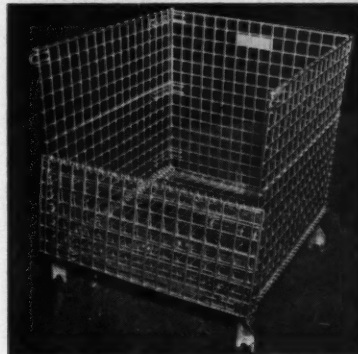
Exhibit—Parker Industrial Sweeper, both in manually-operated and powered models, and its recently developed power attachment for manual models.

Circle 246 on Service Card, Page 35

Pittsburgh Steel Products Co.**Booths 214-222**

Exhibit—The new Clearview Cargotainer and Bulkhead for railroad cars.

Personnel attending—H. D. Stone, W. O. Stoughton, J. B. McCrea, E. L. Virden, Jr., M. J. Sonk and P. F. Mungan.



Circle 247 on Service Card, Page 35

Max Pollock**Booth 430**

Circle 248 on Service Card, Page 35

Port-A-Lift Co.**Booth 136**

Circle 249 on Service Card, Page 35

Porto-Rak Co.**Booth 134**

Circle 250 on Service Card, Page 35

Powell Pressed Steel Co.**Booths 1140-1442**

Exhibit—Examples of corrugated steel skids, boxes, pallets and special containers for a particular application.

Personnel attending—H. L. Powell, A. G. Knowles, H. D. Kennedy and W. A. Glaser.

Circle 251 on Service Card, Page 35

Powers Wire Products Co.**Booth 107**

Exhibit—Complete line of heavy duty air and hand operated stapling machines.

Personnel attending — Jack Hart, F. K. Laidlaw, Kay Harn-den, Joe Galiske, and M. E. Powers.

Circle 252 on Service Card, Page 35
(Please Turn Page)

... Handling Exposition

(Continued from Preceding Page)

Pressed Steel Div., Republic Steel Corp. Booth 1414

Circle 253 on Service Card, Page 35

The Prime-Mover Co. Booth 1520

Exhibit—Powered wheelbarrow with a complete line of accessories, including those powered by the Prime-Mover power take-off shaft. An electric starting $\frac{3}{4}$ ton capacity model will be introduced.

Personnel attending—Arthur E. Dahl, in charge of booth.

Circle 254 on Service Card, Page 35

Prior Products, Inc. Booth 1801

Circle 255 on Service Card, Page 35

The Protectoseal Co. Booth 406

Exhibit—Protectoseal Fittings, which are installed on gasoline and diesel powered industrial tractors, trucks, fork lifts and other types of material handling equipment. This unit, which is made in different sizes to accommodate the thread and flanges on the various makes of vehicles, is for safeguarding the fill opening on the fuel tanks. Also, various types of Protectoseal Safety Storage Containers, Oily Waste Cans, Production Containers, Automatic Self-Closing Faucets, Hand Transfer Pumps and similar items. A new item is the fire protective Machine Bench Parts Cleaning Can.

Circle 256 on Service Card, Page 35

Pullman-Standard Car Mfg. Co. Booth—Exhibit at loading platform on railroad siding.

Exhibit—Several new lading protection devices, including two PS-1 box cars equipped with a new style Compartmentizer, a rubber cushioned underframe and lading strap anchors.



Personnel attending—R. H. Jonston, Jr. and S. C. Nelson.

Circle 257 on Service Card, Page 35

Quaker Rubber Corp. Booth 507

Exhibit—A miniature or model using 3-in. wide conveyor belting. Samples of new conveyor belts: "Mainliner" Nylon Cotton, "Loadliner" Rayon, "Ebonite" Grade and special high climb Safety Grip "Rough-Top" belting. Exhibits will also show ingredients which go into manufacture of rubber and synthetic products.

Personnel attending—A. J. Lamond, B. Gidley, J. Roche, W. H. Van Buren, P. Kuehne, J. R. Alexander, J. McCaughan, W. Murken and J. Shuster.

Circle 258 on Service Card, Page 35

Rack Engineering Co. Booths 1508-1510-1512

Exhibit—General line of material handling equipment, featuring our Rack Conveyors, Adjustable Pallet Racks, and Hydraulic Equipment consisting of Sheet Feed and Die Handling Tables.

Personnel attending—S. Saul, Jr., D. Gold, M. A. Travis, Harold Akers, A. Zwillick, and R. Johnson.

Circle 259 on Service Card, Page 35

Radio Corp. of America, RCA Victor Div. Booth 1250-B

Circle 260 on Service Card, Page 35

Randolph Metal Products Co. Booth 1803

Circle 261 on Service Card, Page 35

The Rapids-Standard Co., Inc. Booths 225-233-235

Circle 262 on Service Card, Page 35

The Raymond Corp. Booths 1426-1525

Circle 263 on Service Card, Page 35

The Ready-Power Co. Booths 1404-1501

Circle 264 on Service Card, Page 35

Revolator Co. Booth 724

Exhibit—"Go-Getter" Electric Walk-A-Long Truck, electrically operated portable elevator, the "Up-lifter" and two different models of hand liftrucks.

Personnel attending—H. S. Germond III, P. D. Germond, William Busse, F. A. Berenbroick, R. Peterson, A. Farnsworth, J. Cannon.

Circle 265 on Service Card, Page 35

Richards-Wilcox Mfg. Co. Booths 1552-1556

Circle 266 on Service Card, Page 35

Robbins & Myers, Inc. Booth 910

Circle 267 on Service Card, Page 35

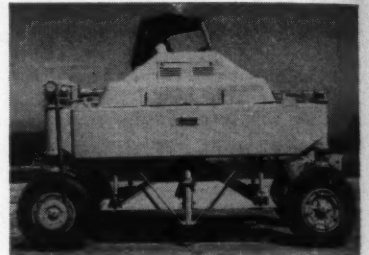
John A. Roebling's Sons Co. Booth 721

Circle 268 on Service Card, Page 35

The Ross Carrier Co. Booths 1103-1105-1107-1109-1111 1113 - 1115 - 1117 - 1119 - 1121 1123-1125-1127

Exhibit—Straddle Carrier, Series 70, 80, 91, 95, 100, Lift Truck, Series 5, 6, 10, 12, 15, 24.

Personnel attending—D. H. Ross, M. S. Ross, H. E. Ross, J. W. Ross, M. B. Dickey, J. J. Mlynski, L. A. DePolis, R. Cole, E. P. Repke, R. W. Spencer, A. L. Bliven, J. I. Merritt,



J. P. Bradshaw, O. E. Jones, J. R. Page, P. A. Marston, W. R. Shepherd, W. M. Gullage, R. M. Merritt, R. H. McGlaughlin, H. A. Murray, J. J. Lawler, George Glasser, John Powers, J. K. Young, Frank Davidson, R. G. Jacobs, C. J. Scott, D. W. Pell, C. G. Kennedy.

Circle 269 on Service Card, Page 35

Rotary Lift Co. Booth 344

Circle 270 on Service Card, Page 35

David Round & Son Booths 1504-1506

Exhibit—Background of photo enlargements of various types of equipment: electric hoists, chain hoists, cranes, portable cranes, winches, trolleys, sheaves, and load binders.

Personnel attending—H. G. Fergus, T. H. Round, W. E. Jackson, and R. B. Vasey.

Circle 271 on Service Card, Page 35

Rowe Methods, Inc. Booth 1519

Exhibit—Featuring "Adjust-A-Dock" and "Adjust-A-Truck," dock leveling ramps.

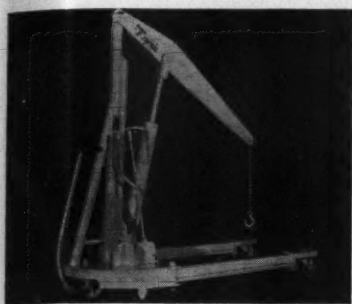
Personnel attending—Arthur E. Rowe, Paul G. Du Bois, and C. W. Choromanski.

Circle 272 on Service Card, Page 35

Ruger Equipment, Inc. Booths 1454-1555

Exhibit—Seven models of portable hydraulic floor cranes and truck-mounted cranes. Three new models will be featured: the one-ton Model HP-18 B having a large cylinder and piston assembly; the adjustable-leg

crane, Model HP-2A, two-ton capacity; and the HP-2WH, another two-ton capacity crane built on a wide base for greater stability.



Personnel attending—W. H. Davis, Paul L. Jarvis, Sherwood Davis, Frank Walton, O. S. Parker, Jr., John Marc Davis, C. L. Jackson, William Abely.

Circle 273 on Service Card, Page 35

**Rushlight's Inc.
Booth 210**

Exhibit—Featuring Pacific Portable Hoists and Winches.

Personnel attending—James T. Burtchaell and Robert Turner.

Circle 274 on Service Card, Page 35

**Saginaw Products Corp.
Booth 445**

Exhibit—Industrial, pneumatic and knee-action casters, pneumatic wheels, factory trucks and moulded-on rubber tired wheels.

Personnel attending—G. K. Mulholland, P. J. Zehnder, Edward L. Lee.

Circle 275 on Service Card, Page 35

**Service Caster & Truck Corp.
Booth 1450**

Circle 276 on Service Card, Page 35

**The Service Recorder Co.
Booth 105**

Circle 277 on Service Card, Page 35

**Service Supply Corp.
Booths 1006-1010**

Circle 278 on Service Card, Page 35

**R. T. Sheehan
Booth 809**

Circle 279 on Service Card, Page 35

**Signode Steel Strapping Co.
Booths 1538-1540**

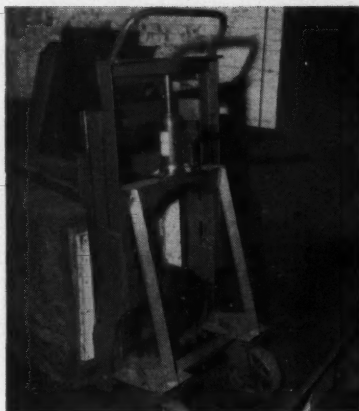
Circle 280 on Service Card, Page 35

**Silent Hoist & Crane Co., Inc.
Booths 1215-1219**

Circle 281 on Service Card, Page 35

**Skarnes Engineering & Supply, Inc.
Booth 338**

Exhibit—Complete line of ROL-A-LIFTS, in four capacities; 2,000 - 4,000 - 6,000 - and 10,000 lb capacity units. The Model M-10, newest 10,000 lb capacity set, is being shown for the first time.



Personnel attending—R. F. Skarnes, Walter G. Burry, and Wilfred N. Lind.

Circle 282 on Service Card, Page 35

**SpanMaster Crane Corp. of America
Booth 535**

Exhibit—Featuring both Top Riding and Underslung SpanMaster Cranes.

Circle 283 on Service Card, Page 35

**Spaulding Fibre Company, Inc.
Booth 812**

Circle 284 on Service Card, Page 35

**Speedways Conveyors, Inc.
Booth 704**

Circle 285 on Service Card, Page 35

**Standard Conveyor Co.
Booths 1530-1534-1536**

Circle 286 on Service Card, Page 35

**Standard Mfg. Co.
Booth 138**

Circle 287 on Service Card, Page 35

**The Stanley Works, Magic Door Div.
Booth 1200**

Circle 288 on Service Card, Page 35

**The Stanley Works, Steel Strapping Div.
Booth 1009**

Circle 289 on Service Card, Page 35

**Star Kimble
Booth 428**

Exhibit—Two integral disc brake motors will be operating, also, an adjustable-varying speed brush-shifting motor. In addition, plan to show one or two electric truck motors which are used in several leading makes of electric trucks.

Personnel attending—C. S. Allen, James M. Adair, R. S. Reed, Howard J. Trombley, Joseph Meisner, Jr., and William Pentin.

Circle 290 on Service Card, Page 35

**Steel Products Fabricators
Booth 914**

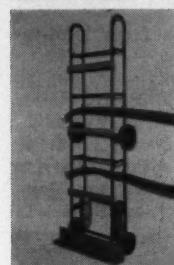
Circle 291 on Service Card, Page 35

**Sterling Bolt
Booth 221**

Personnel attending—D. P. Wertheimer, R. S. Ehrenfeld, Frank Keilman, Norman Riley, Wm. Aleshiro, Al. Wunderle and Harry Roberts.

Circle 292 on Service Card, Page 35

**Stevens Appliance Truck Co.
Booth 514**



Exhibit—Featuring the new ESCORT Truck Model DF-66 hand truck designed for moving home freezer units, pianos and other heavy appliances.

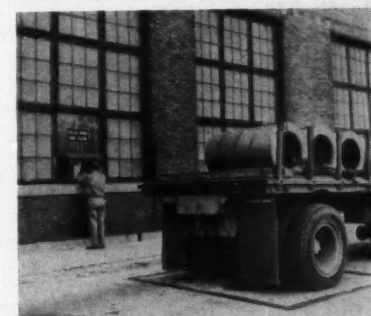
Personnel attending—Mr.

and Mrs. W. P. Stevens, Mr. & Mrs. W. P. Stevens, Jr.

Circle 293 on Service Card, Page 35

**Streeter-Amet Co.
Booth 1843**

Exhibit—Ametron Electronic Scale installations: platform and crane scales. Recorders and Indicating instruments: Ametron desk, wall and cabinet model recorders; miniature



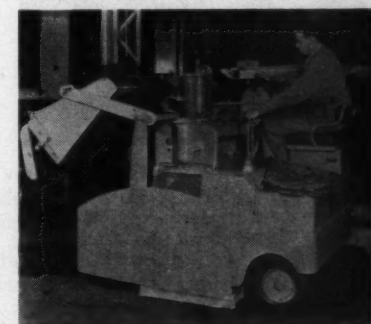
numerical indicator (high-speed counter), visual dial-recorder combination, and remote visual dial.

Personnel attending—V. C. Kennedy, W. R. Daniels, and H. Minor.

Circle 294 on Service Card, Page 35

**G. H. Tennant Co.
Booth 728**

Exhibit—Industrial floor cleaning machines and high speed power sweepers; floor treating materials,



(Please Turn Page)

... Handling Exposition

(Continued from Preceding Page)

new hydraulically equipped floor machine with capacity of an 18-man crew, new fast-drying concrete hardener, new type concrete floor sealer, and high speed portable chipping tool for removing hard rust, scale, paint and chemical deposits from hard-to-reach areas.

Personnel attending—Orville C. Hognander, George D. Billings, Walter Boyer, Robert F. Guthrie, Walter L. Wiegman, E. A. Detweiler, Warner Emerson, Martin R. Sturm, Patrick A. Manfra, Robert H. Baldwin, John F. Thorsen, A. H. Jackson, Robert L. Lindboe.

Circle 295 on Service Card, Page 35

The Thew Shovel Co. Booth 1325-B

Circle 296 on Service Card, Page 35

Thomas Truck & Caster Co. Booth 901

Circle 297 on Service Card, Page 35

Toledo Scale Co. Booth 833

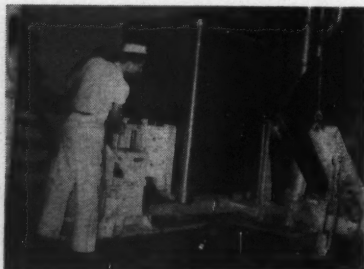
Exhibit—New Speedweigh models for checking and filling applications, the double and triple ratio counting scales, for the accurate counting of small parts, and the Printweigh, which provides weights.

Personnel attending—B. W. Dickey, L. R. Hummel, L. F. Wingfield, J. H. Maiers, R. N. Rockwell, E. D. Sampson.

Circle 298 on Service Card, Page 35

Tote System, Inc. Booth 608

Exhibit—Tote Bins and Tote Tilts and complete data including photographs showing many of their bulk handling installations throughout the country.



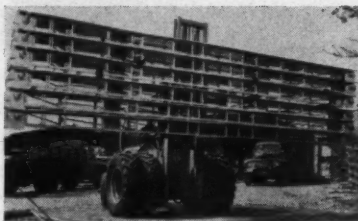
Personnel attending—F. J. White, Jr., Thos. E. Adams, Jr., C. D. Ackerman, E. A. Pagels, V. B. Janson.

Circle 299 on Service Card, Page 35

Towmotor Corp. Booths 1225-1226

Circle 300 on Service Card, Page 35

Tracto-Lift Co. Booth 628



Exhibit—Latest models of lift tractors.

Personnel attending—E. C. Jones, M. M. Jones and Robert Janowitz.

Circle 301 on Service Card Page 35

Tractomotive Corp. Booth 1000

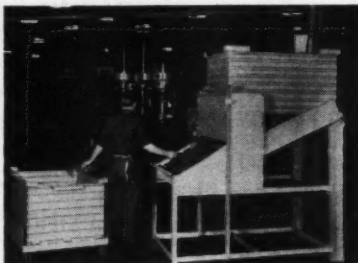
Exhibit—Featuring the TL-10 Tracto Loader and the full line of equipment.

Personnel attending—F. C. Schessler, J. B. Codlin, J. A. Scroggin, L. A. Cochran and J. T. Skinner.

Circle 302 on Service Card, Page 35

Union Metal Mfg. Co. Booth 1106

Exhibit—Demonstrations of the variety of uses for the various units of its "Work-O-Matic System," including Drop-bottom Box, Positioning Stand, Gravity-fed Hopper, Multi-duty Tray, End loading Scoop. Like the United



Nations delegates, visitors will be seated in chairs and will have the demonstrations narrated through individual earphones.

Personnel attending—L. West Shea, L. E. Collins, D. E. Hammond, J. C. Streh, R. B. Jones and E. A. Saunders.

Circle 303 on Service Card, Page 35

Union Steel Products Co. Booth 1241

Circle 304 on Service Card, Page 35

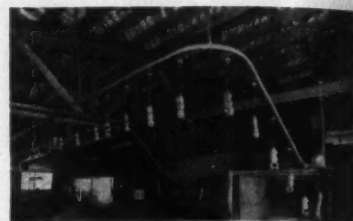
Unistruct Products Co. Booth 1209

Circle 305 on Service Card, Page 35

Unit Crane & Shovel Corp. Booths 1150-1249

Circle 306 on Service Card, Page 35

United States Spring & Bumper Co. Booths 433-435



Exhibit—Chainveyor—a continuous powered overhead chain conveyor.

Personnel attending—E. Wilson, C. L. Long, A. T. Hilland and L. F. Working.

Circle 307 on Service Card, Page 35

United States Steel Co. Booth 633

Circle 308 on Service Card, Page 35

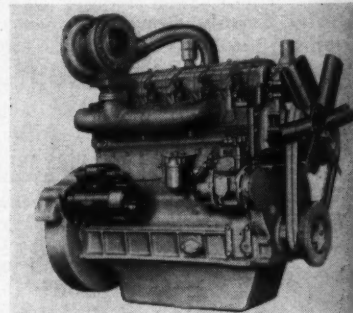
Vickers, Inc. Booths 705-709

Exhibit—Working demonstration of Vickers hydraulic power steering, a lift truck model in which all movements of the miniature fork lift are hydraulically controlled, and a working model of the essential parts of an industrial hydraulic transmission—van pump, directional control valve and vane type fluid motor. These exhibits may be operated by the observer. Cutaway models of the various units which Vickers sells to the Materials Handling field will also be displayed.

Circle 309 on Service Card, Page 35

Waukesha Motor Co. Booth 729 lower arena level

Exhibit—Four small engines used in light materials handling equipment—Model FC, 4-cylinder, 133 cu. in. gasoline engine; Model 180-DLC, a 4-cylinder, 144 cu. in. diesel engine;



Model 195-DLC, a 6-cylinder, 302 cu. in. diesel engine; and Model 135-DKS, a 6-cylinder 426 cu. in. turbocharged diesel engine.

Circle 310 on Service Card, Page 35

Wayne Crane Div., American Steel Dredge Co., Inc. Booth 1420

Circle 311 on Service Card, Page 35

Jervis B. Webb Co.
Booths 524-625

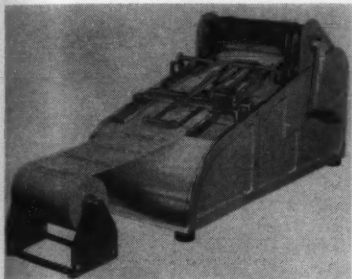
Exhibit—Full size cross-section of Webb Towveyor, moving pictures of all types of conveyor installations, a demonstration of the automatic conveyor controls, animated trolley stand showing both power and hand pushed trolleys.

Personnel attending—J. C. Webb, E. W. McCaul, W. L. Poyntz, J. E. McArthur, G. Webb, R. Stacy, L. Hurst, S. Kavieff, S. B. Ledbetter, F. K. Haven, N. L. Mabrey, H. E. Nelson, R. I. Anderson, E. F. Seiter, R. J. Roland, R. N. Stauffer, D. T. Kaufman, Jr., M. F. Carroll, G. H. Robinson, T. Nagelvoort, F. M. Beatch, J. L. Robinson, J. E. Flannery, G. K. Phares, V. H. Nyman.

Circle 312 on Service Card, Page 35

Weber Addressing Machine Co.
Booth 1550

Exhibit — Tag-O-Graph Models KC-E and K and complete line of stencil type hand printers and direct mail addressing machines.

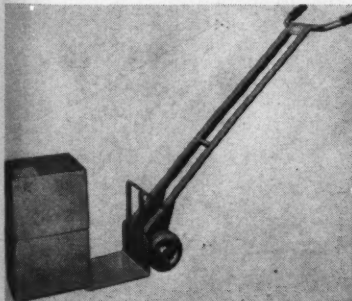


Personnel attending—Joseph Weber and C. E. Ritter.

Circle 313 on Service Card, Page 35

The Wellington Machine Co.
Booth 1135

Exhibit—Heavy Duty Carton Truck, handling loads up to 300 lb, Rite Hite Mold and Die Truck, a portable elevating platform truck for loads up to 1000 lb plus other hand trucks and repre-



sentative samples of Heavy Duty Demountable Rim Easy Rolling Rubber Tired Wheels and Casters.

Personnel attending—Messrs. Conkling, Gannett, and Clisby.

Circle 314 on Service Card, Page 35

West Bend Equipment Corp.
Booth 624

Circle 315 on Service Card, Page 35

Westinghouse Electric Corp.
Booth 1333-A

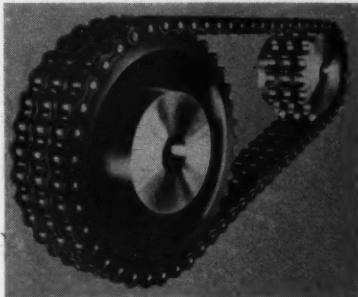
Circle 316 on Service Card, Page 35

Whiting Corp.
Booths 1138-1140

Circle 317 on Service Card, Page 35

Whitney Chain Co.
Booth 123

Exhibit—Featuring Whitney finished steel Roller Chain Drives, used in a variety of applications in materials handling and conveying, such as lift trucks, intra-plant conveying and processing machinery and packaging machinery.

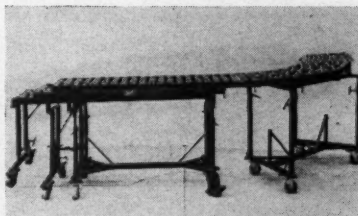


Personnel attending—R. A. Glass, G. A. Turner, J. V. T. Kempton, W. O. R. Korder, F. J. Barry, A. J. Willi, M. H. Bredahl, P. P. Pyle, and H. W. Beder, Jr.

Circle 318 on Service Card, Page 35

The Wilkie Co.
Booth 725

Exhibit—Standard wheel and roller Telescopic Conveyors as well as a deluxe model, which will include a new added feature—all hydraulic height



adjustment. The Flopover Curve, a patented curve used in carloading in conjunction with the Telescopic Conveyor, will also be shown.

Personnel attending—John J. McLaughlin, Harvey Z. Yellin, and Charles F. Woods.

Circle 319 on Service Card, Page 35

Williford Mfg. Co.
Booth 405

Circle 320 on Service Card, Page 35

Wilshire Power Sweeper Co.
Booth 504

Circle 321 on Service Card, Page 35

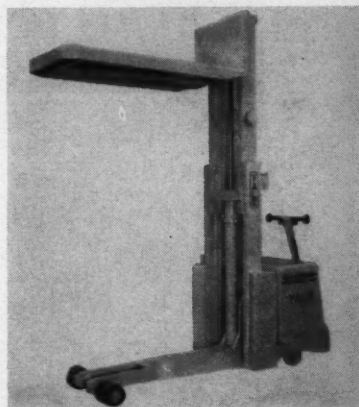
Wirebound Box Manufacturers Assoc.
Booth 245

Exhibit—Wirebound boxes and crates with stress on easy accessibility of plants and distribution throughout the country.

Circle 322 on Service Card, Page 35

The Yale & Towne Mfg. Co.
Booths 248-249 & entire stage

Exhibit—Traveling Show carried in two tractor trailers will be on stage, with new equipment and new adaptations of present equipment on display. Over 20 different trucks with worksaving attachments, including gas, diesel and electric trucks, work-



savers and hand trucks. In the booths hand and electric hoists will be displayed.

Personnel attending—James Conkling, J. A. Shellenberger, J. J. Murray, G. A. Vining, C. O. Hedner, J. I. Somers, T. F. Moriarty.

Circle 323 on Service Card, Page 35

Final Coverage in June Issue

In the June issue, readers unable to visit the show will be given a complete report on outstanding new products, panel discussions and papers or addresses presented at the technical sessions.

This is a preliminary coverage of the show. It has been necessary to confine information published to material received by the time the issue went to press.—Ed.

BUILT...

like a bridge

for strength

BUILT...

of aluminum

for lightweight

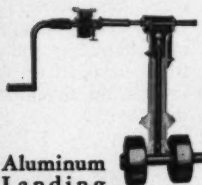
**model
TA**



Diamond Strut Ribs to carry concentrated loads.



Girder Steel Load Distributor Frame.



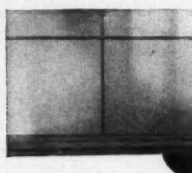
Aluminum Landing Gear—2-speed, constant lubrication, positive action with "Gear Lock."



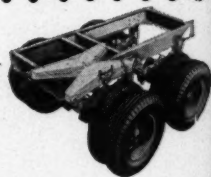
Aluminum Extruded Quarter Panel to tie the sides and roof together (no washboarding, no rust).



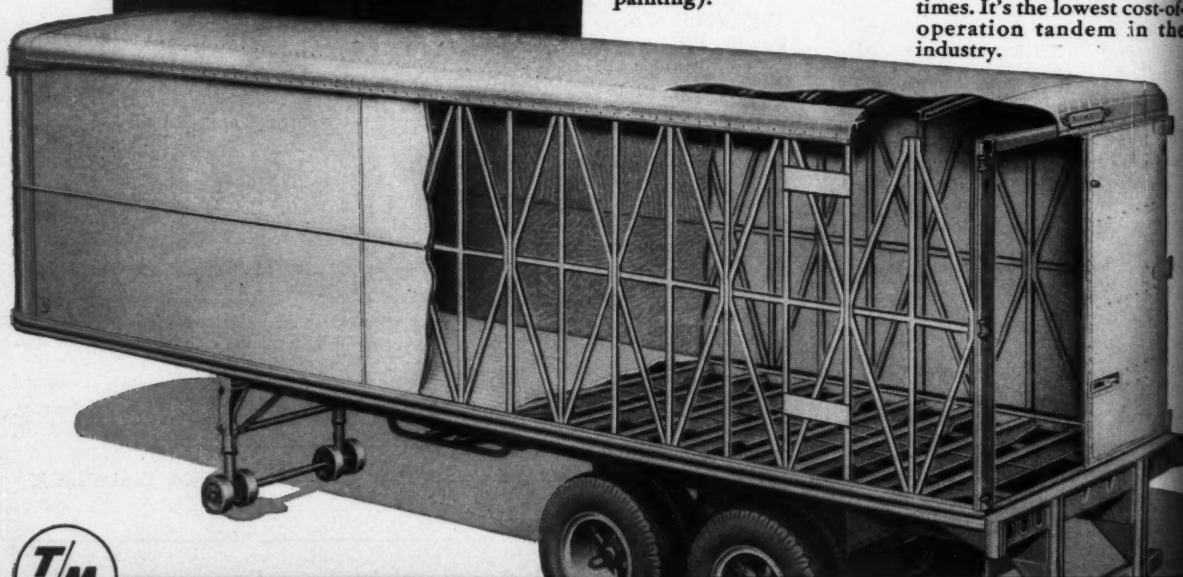
Steel Roof bows give strength and rigidity.



Aluminum Side Sheets and Moulding (Alclad, corrosion resistant, no painting).



Famous Trailmobile Tandem—two husky rocker beams maintain constant load equalization and braking force on both axles at all times. It's the lowest cost-of-operation tandem in the industry.



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Circle No. 13 on Card, Page 35, for more information

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DA MASTER CHART OF BASIC MATERIAL HANDLING EQUIPMENT

ARRANGED ACCORDING TO TYPE OF MOTION

D. O. HAYNES, Consulting Industrial Engineer

1 Haulage Systems

Horizontal motion over fixed or variable level or nearly level routes by pulling or pushing on surface riding vehicles

1-A—Fixed Routes

1-A-1—Truck Dragging Systems

- a—Overhead Trolley Type
- b—In-Floor Type

1-A-2—Industrial Railroads

- a—Locomotives
- b—Cars

1-B—Variable Routes

1-B-1—Industrial Hand Trucks

- a—Dollies
 - 1—Furniture
 - 2—Lever
 - 3—Milk Case
 - 4—Pallet & Skid
 - 5—Paper Roll
 - 6—Roller
- b—Wheelbarrows
- c—Two Wheel
 - 1—Appliance
 - 2—Bag
 - 3—Baggage
 - 4—Barrel
 - 5—Cable Reel
 - 6—Cannery
 - 7—Carboy
 - 8—Caterpillar
 - 9—Chisel
 - 10—Combination
 - 11—Cotton
 - 12—Cylinder Tank
 - 13—Lift
 - 14—Stevedore
 - 15—Tote Boy
 - 16—Utility
 - 17—Warehouse
 - Eastern
 - Western
- d—Three-Wheel
- e—Non-Lift Platform
 - 1—Baggage
 - 2—Box
 - 3—4-Wheel
 - 4—5th Wheel Steer
 - 5—6 Wheel

1-B-2—Skid Platforms

See 5-A—Skid Systems

1-B-3—Powered Industrial Trucks

- a—Wheelbarrows
- b—3 Wheel
- c—Non-Lift Platform

1-B-4—Trackless Trains

- a—Industrial Tractors
 - 1—Light Duty
 - 2—3-Point
 - 3—4-Point
- b—Industrial Trailers
 - 1—Balanced
 - 2—Caster Steer
 - 3—4-Wheel Steer
 - 4—5th Wheel Steer

2 Elevating Systems

Vertical Motion over fixed vertical or steeply inclined routes with continuous or with intermittent motion

2-A—Continuous Motion

2-A-1—Vertical-Type Conveyors

- a—Arm
- b—Bucket
- c—Push Bar
- d—Suspended Carriages

2-B—Intermittent Motion

2-B-1—Fixed Arm Cranes

- a—Wall
- b—Floor

2-B-2—Fixed Arm Derricks

2-B-3—Fixed Hoists

- a—Manual
 - 1—Block & Tackle
 - 2—Ratchet
 - 3—Differential
 - 4—Screw Geared
 - 5—Spur Geared
- b—Air
 - 1—Air Cylinder
 - 2—Air Motor
- c—Electric
- d—Whip

2-B-4—Winches

- a—Manual
- b—Electric
- c—Fuel or Steam Engine

2-B-5—Stackers

2-B-6—Levelers

2-B-7—Elevators

- a—Dumbwaiters
- b—Skip Hoists
- c—Freight Elevators

3 Conveying Systems

Horizontal, inclined or fixed routes by gravity

3-A—Gravity Systems

3-A-1—Sliding Friction Conveyors

- a—Skids
- b—Chutes
 - 1—Plain
 - 2—Flexible
 - 3—Spiral

3-A-2—Rolling Friction Conveyors

- a—Gravity Wheel
- b—Gravity Roller
- c—Flexible
- d—Gravity Roller Spiral

IC MATERIALS HANDLING SYSTEMS

O THEIR FUNCTIONAL OPERATION *

Industrial Engineer, DISTRIBUTION AGE

Conveying Systems

Inclined or declined motions over
by gravity or by power

4 Transferring Systems

Horizontal, vertical or compound motions
through the air over fixed routes or limited
areas with intermittent motion

5 Self-Loading Systems

Intermittent motion with machines that pick up,
move horizontally, set down and, in some cases,
tier loads without other handling. Also known
as Unit-Load Systems.

3-B—Powered Systems

4-A—Fixed Routes

4-B—Limited Areas

5-A—Skid Systems

5-B—Pallet Systems

3-B-1—Belt Conveyors

- a—Slide Bed
- b—Roller Bed
- c—Live Roller
- d—Trough

4-A-1—Monorails

- a—Manually Propelled
- b—Power Propelled

4-B-1—Derricks

- a—Stiff Leg
- b—Guy-Line
- c—Miscellaneous
 - 1—Pole
 - 2—Sheev-Leg
 - 3—A-Frame
 - 4—Tripod

5-A-1—Skids

- a—Live
- b—Semi-Live
- c—Dead

5-B-1—Pallets

- a—Materials
- b—Fastenings
- c—No. Faces (Decks)
- d—Reversibility
- e—Stringer
- f—No. Entries
- g—Special Types

3-B-2—Cable Con- veyors

- a—Drags
- b—Overhead Trolley

5-A-2—Skid Jacks

- a—Hand Jack
- b—Powered Tractor

5-B-2—Low-Lift Fork Trucks

- a—Hand
- b—Powered Hand
 - 1—Non-Ride
 - 2—Ride

3-B-3—Chain Con- veyors

- a—Apron
- b—Drag
 - 1—Package
 - 2—Bulk Material
- c—Flight
 - 1—Push
 - 2—Roller
- d—Live Roller
- e—Pallet
- f—Slat
- g—Vertical
 - 1—Arm
 - 2—Bucket
 - 3—Push Bar
 - 4—Suspended Carriage
- h—Trolley
 - 1—Overhead
 - 2—In-floor

4-B-2—Cranes

- a—Jib
 - 1—Wallbracket
 - 2—Column
 - 3—Pillar
 - 4—Portable
- b—Bridge
 - 1—Overhead Travelling
 - 2—Gantry
 - a—Semi
 - b—Full
- c—Portal
- d—Power
 - 1—Automotive
 - a—Crawler
 - b—Truck
 - c—Wheel
 - 2—Locomotive

5-A-3—Low-Lift Plat- form Trucks

- a—Hand
 - 1—Mechanical Lift
 - 2—Hydraulic Lift
- b—Powered Hand
 - 1—Non-Ride
 - 2—Ride
- c—Powered Platform Lift
 - 1—Non-Ride
 - 2—Ride

5-B-3—High-Lift Fork Trucks

- a—Handstackers
- b—Powered Handstackers
 - 1—Non-Ride
 - 2—Ride
- c—Counter Balanced
Powered Handstacker
 - 1—Non-Ride
 - 2—Ride
- d—Cantilever Fork-Lift
Trucks

3-B-4—Portable

- a—Apron
- b—Belt
- c—Bucket
- d—Curvable
- e—Extendable
- f—Flight
- g—Screw

3-B-5—Pneumatic

3-B-6—Screw

5-C—Other Unit- Load Systems

5-C-1—With Load- Carriers

- a—End-Loading Trucks
- b—Side-Loading Trucks
- c—Overhead Crane Stacker
- d—Power Crane Forks

5-C-2—Without Load- Carriers

- a—Fork Truck Accessories
 - 1—Clamps
 - 2—Cranes
 - 3—Grabs
 - 4—Push-Pull
 - 5—Rams
- b—Below-the-Hook Ac-
cessories
 - 1—Grabs
 - 2—Magnets
 - 3—Slings

Equipment, find same index number on following pages as shown opposite desired item in boxes above.

MATERIALS HANDLING SYSTEMS, PART

ARRANGED ACCORDING TO THEIR FUNCTION

D. O. HAYNES, Consulting Industrial Engineer, DISTRIBUTOR

6 Haulage Systems

6-A—Industrial Truck Mounting

6-A-1—Casters

- a—Canvas
- b—Metal
 - 1—Aluminum Alloy
 - 2—Steel
 - a—Semi Steel
 - 1—Plain Tread
 - 2—Grooved Tread
 - b—Pressed Steel
- c—Plastic
- d—Rubber Tired
 - 1—Semi-Pneumatic
 - 2—Solid
 - a—Metal Core
 - 1—Moulded-on
 - 2—Pressed-on
 - b—Steel Disc
 - 1—Moulded Tire
- e—Wood

6-A-2—Wheels

- a—Metal
 - 1—Aluminum Alloy
 - 2—Malleable Iron
 - a—Plain Tread
 - b—Grooved Tread
 - 3—Semi-Steel
 - a—Plain Tread
 - b—Grooved Tread
- b—Moulded Composition
 - 1—Hard Rubber
 - 2—Soft Rubber
- c—Rubber Tired
 - 1—Pneumatic
 - 2—Semi-Pneumatic
 - 3—Solid
 - a—Moulded-on
 - b—Pressed-on
- d—Spoke
 - 1—Steel
 - 2—Steel and Wood
 - 3—Wood

6-A-3—Tires

- a—Pneumatic
- b—Semi-Pneumatic
- c—Solid
 - 1—Moulded-on
 - 2—Pressed-on

6-A-4—Bearings

- a—Plain
- b—Self-Lubricating
- c—Ball
- d—Roller
 - 1—Straight
 - 2—Needle
 - 3—Tapered
- e—Combination Ball & Roller

6-B—Industrial Powered Truck Accessories

6-B-1—Sources of Power

- a—Fuels
 - 1—Diesel Oil
 - 2—Gasoline
- b—Storage Batteries
 - 1—Lead-Acid
 - 2—Nickel-Iron Alkaline
- c—Ready-Power Units
 - 1—Gas-Electric
 - 2—Diesel-Electric

6-B-2—Battery Charging

- a—Charges
 - 1—Motor Generators
 - 2—Rectifiers
 - a—Copper-Oxide
 - b—Selenium Oxide
- b—Battery Parts & Accessories
 - 1—Connectors
 - a—Cable
 - b—Cable Terminal
 - c—Cell
 - 2—Charging Plugs & Receptacles
 - 3—Charge Controls
 - 4—Cell Filler
 - 5—Hydrometer Syringes
 - 6—Voltage Testers

6-B-3—Miscellaneous Accessories

- a—Lubricants
- b—Lubricating Systems
- c—Exhaust Neutralizers
- d—Safety Fuel Cans

7 Elevating Systems

7-A—Elevating Accessories

1—Elevator Belting

2—Freight Elevator

- a—Doors
- b—Stills

7-B—Hoist Accessories

1—Blocks

2—Chain Wheels

3—Current Conductors & Collectors

4—Limit Switches

5—Variable Speed Controls

6—Air Compressor Systems

7—Load Carriers

- a—Grabs
- b—Hooks
- c—Slings
 - 1—Chains
 - 2—Wire Rope
 - 3—Woven Wire
- d—Tongs

8 Conveying Systems

8-A—Gravity Systems

8-A-1—Wheel Conveyors

- a—Parts
 - 1—Aluminum
 - 2—Steel
 - 3—Other
- b—Complete Sections
 - 1—Aluminum
 - 2—Steel
 - 3—Other
- c—Guard Rails
 - 1—Non-Adjustable
 - 2—Adjustable
- d—Supports
 - 1—Non-Adjustable
 - 2—Adjustable
 - 3—Stationary
 - 4—Castered
 - 5—Ceiling Hangars
 - 6—Wall Brackets
- e—Package Controls
 - 1—Flow Controls
 - 2—Stops
 - 3—Counters
 - a—Mechanical
 - b—Electrical
 - c—Electronic
- f—Ball Transfers
 - 1—Ball Assemblies
 - 2—Plates or Tables
 - 3—Shields

8-A-2—Roller Conveyors

- a—Rollers
 - 1—Aluminum
 - 2—Brass
 - 3—Magnesium
 - 4—Plastic
 - 5—Steel
 - 6—Wood
- b—Bearings
 - 1—Ball
 - a—Plain
 - b—Semi-Enclosed
 - c—Fully-Enclosed
- c—Sections
 - 1—Aluminum
 - 2—Magnesium
 - 3—Steel
- d—Guard Rails
 - 1—Non-Adjustable
 - 2—Adjustable
- e—Supports
 - 1—Non-Adjustable
 - 2—Adjustable
 - 3—Stationary
 - 4—Castered
 - 5—Ceiling Hangars
 - 6—Wall Brackets
- f—Package Controls
 - See 8-A-1e

PARTS & ACCESSORIES

FUNCTIONAL OPERATION *

DISTRIBUTION PAGE

ing System

8-B—Powered Conveyors

1—Belt

- a—Canvas Stitched
- b—Cotton Woven
- c—Impregnated
- d—Heat Resistant
- e—Rubber Covered
- f—Stainless Steel
- g—Woven Wire

2—Cable

3—Chain

4—Magnet Pulleys

5—Rollers (End & Idler)

6—Power Elements

- a—Complete Power Units
- b—Control Boxes
- c—Speed Reducers
- d—Variable Speed Drives

7—Guard Rails

- a—Non-Adjustable
- b—Adjustable

8—Supports

- a—Non-Adjustable
- b—Adjustable
- c—Stationary
- d—Castered
- e—Ceiling Hangers
- f—Wall Brackets

9—Package Controls See 8-A-1e

10—Trolleys & Other Overhead System Parts See next columns

9 Transferring Systems

9-A—Monorail Systems

1—Monorail Track

2—Track Hangers

3—Current Distribution Systems

4—Controls

- a—Manual
- b—Powered

6—Trolley Wheels

7—Trolley Tractors

9-B—Crane Systems

9-B-1—Overhead Cranes

- a—Brakes
 - 1—Hydraulic
 - 2—Mechanical
- b—Bridges
 - 1—Manual
 - 2—Power
- c—Controller
- d—Interlocks
- e—Load Carriers
See 7-B-7

9-B-2—Power (Mobile) Cranes

- a—Front-End Attachments
 - 1—Bulk Materials
 - a—Clamshell
 - b—Dragline
 - c—Orange Peel
 - d—Magnet
 - 2—Heavy Items
 - a—Hook Blocks
 - 1—Single Sling
 - 2—Bridle Sling
 - b—Hooks
 - 1—Hair Pin
 - 2—Special
 - 3—Loose Stacked Material
 - a—Clamps
 - b—Grabs
 - c—Gapples
 - d—Tongs
- 4—Containers & Weights
 - a—Concrete Buckets
 - b—Skips
 - c—Tote Box
 - d—Skull Crackers

10 Self-Loading Systems

10-A—Fork Truck Parts and Accessories

10-A-1—Low-Lift Fork Trucks

- a—Skid Platform Adapters

10-A-2—High-Lift Fork Trucks

- a—Special Fork Types
- b—Fork Extensions
- c—Special Carriages and Attachments
(See also 5-C-2a)
 - 1—Extra High-Lift
 - 2—Hydraulic Pushers
 - 3—Revolving Forks
 - 4—Scoops
 - 5—Side-Shifting Forks
 - 6—Snow Plow
 - 7—Sweepers
- d—Back Stops
- e—Overhead Guards

10-B—Unit-Load Handling Accessories

- 1—Automatic Pallet Loaders
- 2—Unit Load Binders
- 3—Adhesives
- 4—Adhesive Applicators
- 5—Tape
- 6—Tape Dispensers
- 7—Steel Strapping
- a—Flat
- b—Round
- 8—Strapping Tools
- a—Flat
- b—Round
- 9—Skid & Pallet Storage Racks
- 10—Carton Shields

11 Handling & Building Accessories

11-A—Freight Handling

- 1—Bulkheads
- 2—Bulkhead Anchors
- 3—Car-Door Load Bracers
- 4—Car Liners
- 5—Car Prys
- 6—Car Pullers
- 7—Yard Switch Engines
- 8—Door Openers
- 9—Dock Boards

11-B—Motor Truck & Trailer Handling

- 1—Elevating End Gates
- 2—Tarpaulins
- 3—Wheel Chocks

11-C—Loading Platforms Handling

- 1—Bridge Plates (Ramps)
 - a—Manual
 - 1—Aluminum
 - 2—Magnesium
 - 3—Steel
 - b—Powdered
- 2—Canopies
- 3—Cross-over Bridges

11-D—Building and Yards

- 1—Aisle (Floor) Markers
- 2—Bins
- 3—Fire Protection
 - a—Alarms
 - 1—Automatic
 - 2—Manual
 - b—Extinguishers
 - c—Extinguisher Systems
 - d—Hose
 - e—Smoke Detection Systems
 - f—Sprinklers
 - 1—Automatic System
 - 2—Supervisory Service
- 4—Floor Maintenance
 - a—Patches & Resurfacers
 - b—Scrubbers
 - c—Sweepers
 - d—Vacuum Cleaners
- 5—Sanitation
 - a—Fumigated
 - b—Insecticides
 - c—Rodenticides
 - d—Rodent Traps
- 6—Security
 - a—Burglar Alarms
 - b—Industrial Fencing
 - c—Watchman's Clocks
 - d—Watchmen's Service
- 7—Storage Protection
 - a—Covers
 - b—Pads
 - c—Shelving

1

Haulage Systems

Means of pulling or pushing materials carried on surface-riding vehicles over horizontal or almost horizontal, fixed or mobile routes.

1-A.

FIXED ROUTES

1-A-1. Truck Dragging Systems

Power-driven, endless cable- or chain-conveying systems to which industrial trucks or trailers can be attached, hauled over a fixed route, and disengaged at any desired destination.

These systems of handling must be carefully engineered to fit given physical and operating conditions. Optional types are

- a. Overhead Trolley Chain or Cable Types
- b. In-Floor Chain Type

APPLICATION

Used for hauling materials over relatively long distances on loading platforms or through buildings where there is no interference with other traffic.

Both types can be designed to operate over almost any desired route—straight, curved up to 180 deg, level, inclined, or declined. The loads usually, but not always, move unattended.

Frequently employed at railroad and truck terminals for handling l.c.l. freight, also in distribution warehouses for selecting and accumulating items for outgoing deliveries. Articles usually are placed on, and removed from, the load-carriers by hand.

This system can be integrated with others, especially the fork truck and pallet system; in which case, the conveyor takes over the transporting function for longer distances than are practical with fork truck equipment.

1-A-1-a. TRUCK DRAGGING SYSTEMS—

Overhead

Cable or Chain
Trolley Types



A hanger-mounted, trolley conveyor system consisting of an endless track over which operate regularly-spaced trolleys attached to, and moved by, a powered endless cable or chain from which are suspended hooks or other

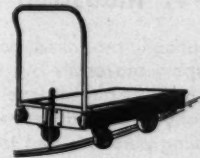
means of engaging and disengaging industrial trucks or trailers.

APPLICATION—Where building characteristics and operating conditions are such that an overhead conveyor can function properly.

1-A-1-b. TRUCK DRAGGING SYSTEMS—

In floor

Type



An endless chain conveyor which runs directly under, and slightly below, the level of a slot in the floor over which the device is to drag industrial trucks or trailers. Connections between the drag and the load-carrier is made by means of a bolt or other coupling device at the front end of the latter which engages with the chain.

This system sometimes is referred to as an under-floor conveyor.

APPLICATION—Used for the same general purposes as the overhead types in locations where the under-floor-level feature makes it the logical choice. It has found its greatest acceptance in order-picking operations.

1-A-2. Industrial Railroads

Systems of trackage, locomotives and rail cars privately operated to serve a limited area. The term, here, is restricted to systems with relatively light rolling stock which operate on narrow gauge (4 ft 8½ in.) track.

APPLICATION

In wide-spread industrial areas, at wharves, etc., for transporting materials over relatively long distances.

The method is based on the sound principle of having a single, detachable motive unit haul a number of carriers. However, more flexible systems are gradually supplanting this method.

It is frequently tied-in with other systems; as when cars are loaded by cranes, and when it is used to transport unitized loads over long distances.

1-A-2-a. INDUSTRIAL RAILROADS—Locomotives

The traction units of industrial railroads. They are available with any desired source of power—diesel, diesel-electric, electric battery, third-rail, gasoline, gasoline-electric, or steam.

1-A-2-b. INDUSTRIAL RAILROADS—Cars

The load-carrying units of industrial railroads. The flatcar is the most widely used type, but others, such as

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1953, Pages 55 to 100

1-Haulage Systems, cont.

side- and bottom-dumpers, gondola, stake and crane cars are used for special handling operations.

1-A-3. Winches

(See 2-B-4, Elevating Systems)

1-B. VARIABLE ROUTES

1-B-1. Industrial Hand Trucks

Manually propelled, non-elevating vehicles used to transport materials by pulling or pushing over mobile, level or almost level routes.

Many types have been developed for specific handling purposes, but the prospective user can find one to fit almost any requirement from the many available in different combinations of sizes, weights, capacities, running gears, styles of superstructures, etc.

The following classification of industrial hand trucks is based primarily on their general characteristics, especially as to their running gear.

- a. Dollies
- b. Wheelbarrows
- c. Two-Wheel Hand Trucks
- d. Three-Wheel Hand Trucks
- e. Non-Elevating Platform trucks

The specific trucks listed under each general type, on this and the following pages, are representative, rather than complete.

APPLICATION

The most universally used group of equipment in the materials handling field. In most instances, where operations have been largely mechanized, hand trucks still are used as the most economical means of moving light loads over short distances.

The amount of weight that can be handled efficiently with these devices depends upon whether they are moved by one or more men, the nature of the material itself (its density, etc.), the general design of the truck, arrangement of the running gear, type of bearings, lubrication, size and material of wheels, and working conditions (temperature, humidity, floor or ground surfaces).

1-B-1-a. INDUSTRIAL HAND TRUCKS—Dollies

Originally used to designate a small platform with a single roller, the term now includes any small, usually low, truck with one or more rollers, casters or wheels or a combination of these. The following are representative special-purpose types:

- | | |
|--------------|-------------------|
| 1. Furniture | 4. Pallet or Skid |
| 2. Lever | 5. Paper Roll |
| 3. Milk Case | 6. Roller |

APPLICATION—The use of dollies is restricted to very short distances. They are, however, helpful in moving machinery in plants, shifting furniture, etc.

They are used by warehousemen, truckers, merchants and many others for moving heavy objects a short distance (a few feet). Special dollies for handling unitized loads have been developed during the last few years.

1-B-1-a-1. DOLLIES—Furniture

Small triangular or rectangular, padded dollies with swivel casters, used by warehousemen, department stores and others for moving furniture. The all-caster running gear makes these trucks difficult to push in a straight path. They tend to creep sideways.

1-B-1-a-2. DOLLIES—

Lever



Although this device has two wheels, it is usually classified as a dolly and is, therefore, included in this category. When the short nose of this dolly is pushed under the edge of an object, the long lever arm is lowered and the object is raised slightly. Sometimes used in pairs, one at each end, to move a heavy object over short distances. It could be called a mobile crowbar.

1-B-1-a-3. DOLLIES—Milk Case

Rectangular, angle-frame dollies fitted with wheels, used to move milk cases over short distances. Sizes are available to accommodate one to six cases.

1-B-1-a-4. DOLLIES—Pallet and Skid

Dollies designed for pushing pallets and skids. The roller type is available in two styles. One has rollers on the bottom only and is used for moving unit loads over short areas—as in unloading over-the-road carriers, hauling from the end of production lines to storage areas, etc.

The other type has two sets of rollers, one permitting the load to be moved off at right angles to the line of travel.

1-B-1-a-5. DOLLIES—Paper Roll

Small, sturdy built, dollies with a curved recess to accommodate a roll of paper. Available in balanced four-wheel construction, with capacities up to 2000 lbs.

1-B-1-a-6. DOLLIES—Roller

Small dollies equipped with rollers, but not specifically designated to handle unit loads on pallets or skids. This type of running gear gives controlled motion along straight paths of travel, but cannot be used to turn through any but slight curves.

1-B-1-b. WHEELBARROWS

One of the earliest handling devices for hauling bulk materials. Wheelbarrows are manufactured of wood or metal and with single or dual front wheels. Pneumatic tires make for easier handling, especially over rough surfaces. Widely used in boiler rooms, shops, on construction work, etc.

1-B-1-c. HAND TRUCKS—Two Wheel

These trucks apply the principle of the lever in a practical way to enable a man to handle and move heavier loads than he can manipulate with his unaided muscles. The fulcrum of the lever system is at the axis of the wheels. The load frequently extends forward of this point and, hence, part of the load's weight counterbalances the portion lifted by the operator.

Types are available with one or two handles, metal, rubber or composition wheels, and other variations to fit

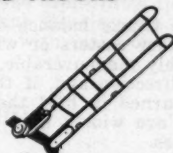
particular requirements. The following are representative types:

- | | |
|--------------------------------|----------------------|
| 1. Appliance | 9. Chisel |
| 2. Bag | 10. Combination |
| 3. Baggage | 11. Cotton |
| 4. Barrel | 12. Cylindrical Tank |
| 5. Cable Reel | 13. Lift |
| 6. Cannery | 14. Stevedore |
| 7. Carboy | 15. Tote Box |
| 8. Caterpillar | 16. Utility |
| 17. Warehouse—Eastern, Western | |

APPLICATION—Usually limited to loads of between 400 and 500 lbs. and distances up to 150 ft. Warehousemen, stevedores, merchants and operators in plants are among the almost universal users of two-wheel trucks.

I-B-1-c-1. TWO-WHEEL HAND TRUCKS—

Appliance



A truck characterized by its broad, rectangular frame and blunt nose. The frame parts are covered with rubber or other protective material where contact is made with the load. Canvas belts are attached to make the load fast during handling operations.

Used by retailers, jobbers, warehousemen and others for moving refrigerators, radios, television sets, kitchen cabinets and other household appliances which have easily damaged surfaces.

I-B-1-c-2. TWO-WHEEL HAND TRUCKS—Bag

Designed to facilitate the safe handling of bagged goods, these trucks have all-smooth construction, relatively deep noses and wheels set inside the frame, or otherwise guarded to afford complete protection against chafing.

I-B-1-c-3. TWO-WHEEL HAND TRUCKS—Baggage

A light construction truck used by porters in handling passengers' baggage in depots.

I-B-1-c-4. TWO-WHEEL HAND TRUCKS—Barrel

Specially-designed trucks intended to permit one-man handling of barrels. The toes slip under the chime of the barrel and, as the truck handles are moved down, the barrel settles on the truck.

Models are available with hoops or with clamps to aid the operator. The hoop type does not subject the barrel to any strain. The clamp type is especially useful in handling drums, but is not recommended for handling barrels with fabric covers over the loads, as are frequently seen in produce markets.

I-B-1-c-5. TWO-WHEEL HAND TRUCKS—

Cable Reel

A single-purpose truck designed to engage the trunnion of a cable reel, elevate the reel slightly when the handles are depressed and, thus, permit it to be carried a short distance. Made in various sizes to handle reels up to 48 in. in diameter and 32 in. wide.

I-B-1-c-6. TWO-WHEEL HAND TRUCKS—Cannery

The distinguishing feature of this truck is its upright frame. In some models the side frame comes in contact with the load; in others, uprights are added to provide vertical sides.

Used widely in food processing and bottling industries for handling tiered cartons or cases.

I-B-1-c-7. TWO-WHEEL HAND TRUCKS—Carboy

A small truck equipped with carrying arms—actuated by a foot pedal—which engage, elevate and support the carboy during travel. Made in sizes to fit all standard carboys.

I-B-1-c-8. TWO-WHEEL HAND TRUCKS—

Caterpillar

A relatively new type of hand truck designed to facil-

itate the handling of loads up and down stairs. A caterpillar tread extends lengthwise for a short distance along the underside of the two side frames. The truck rides on these treads in moving from step to step. Smooth travel results instead of bumping from step to step when more conventional types of hand trucks are used.

Frequently used in handling beverage cases.

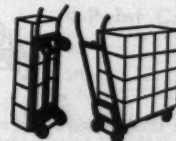
I-B-1-c-9. TWO-WHEEL HAND TRUCKS—Chisel

This truck has a smooth, flat nose which can be easily pushed under boxes, crates, machine parts, etc., to assist in positioning them on the truck. The truck acts as a pry, but is considerably larger than the Lever Dolly.

(See I-B-1-a-2 above.)

I-B-1-c-10. TWO-WHEEL HAND TRUCK—

Combination



A two-wheel truck which can be used in the regular way to transport materials, and as a jack for a semi-live skid.

I-B-1-c-11. TWO-WHEEL HAND TRUCKS—Cotton

A truck with toed-in prongs which facilitate the handling of cotton, waste and other materials in bales.

I-B-1-c-11. TWO-WHEEL HAND TRUCKS—

Cylindrical Tank

A hand truck designated to carry one or more cylinders of gas in an upright position. An adjustable chain holds the load in place during handling.

I-B-1-c-13. TWO-WHEEL HAND TRUCKS—

Lift



This truck is not to be confused with the true lift-type trucks. Its lifting action is not mechanical. It is used for raising slightly and moving large crates, etc.

I-B-1-c-14. TWO-WHEEL HAND TRUCKS—

Stevedore

This is not a true class of trucks. It includes almost any truck which is used in stevedoring operations. Most stevedores have a favorite type which they consider to have the best "feel" for their work, and it might be any one of a variety of sturdy, heavy-duty trucks.

I-B-1-c-15. TWO-WHEEL HAND TRUCKS—

Tote Box

A special-purpose truck equipped with two lever arms which extends forward and engage lugs on the side of a tote box. When the arms of the truck are lowered, the box is lifted clear of the floor.

Widely used in manufacturing plants for moving small parts from machine to machine and into storage areas.

I-B-1-c-16. TWO-WHEEL HAND TRUCKS—Utility

A wide variety of two-wheel trucks of light construction (frequently of magnesium or aluminum) designed to handle loads up to 100 lbs., such as small articles, cartons, parcels, baggage, etc.

I-B-1-c-17. TWO-WHEEL HAND TRUCKS—

Warehouse

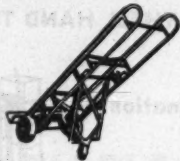
These trucks are the most widely used general-purpose two-wheel hand trucks. They are made in two styles. The

1—Haulage Systems, cont.

Eastern (also called the New York Style) has a tapered frame, narrower at the top than at the bottom, and the wheels set outside of the frame. Wide metal plates protect the load from contact with the wheels.

The Western Style, on the other hand, has a straight frame and the wheels are set inside the frame.

I-B-1-d. THREE-WHEEL HAND TRUCKS



These trucks have the same general construction as the two-wheel hand trucks, but a third wheel is added under the body of the truck so that the load is carried on three instead of two wheels. The operator's arms are relieved of having to carry the load.

I-B-1-e. NON-LIFT PLATFORM TRUCKS

This class sometimes is called floor trucks. The one common characteristic of this large class of hand trucks is their flat, non-elevating, rectangular carrying surface.

Models are available with practically any desired combination of size, capacity, material or construction, running gear, upper structure, wheel size, material and lubrication. A few representative types are:

1. Baggage
2. Box
3. Four-wheel
4. Fifth-wheel Steer
5. Six-wheel

APPLICATION—Still widely used for hauling an infinite variety of materials over relatively short distances. In certain situations they are integrated with the unit-load systems of handling, as, for instance, in some elevator operations in multi-storied buildings.

I-B-1-e-1. NON-LIFT PLATFORM TRUCKS—

Baggage

This drop-frame type of truck is still seen on most railroad platforms and baggage rooms. It has handle pulls at both ends and the trailing end can be made fast so that steering is done from the front, or lead end, only.

I-B-1-e-2. NON-LIFT PLATFORM TRUCKS—

Box



These castered trucks with box superstructures are widely used in the textile, laundry and similar industries. They are lightly but sturdily built with sides of various kinds of materials, such as wood and pressboard.

I-B-1-e-3. NON-LIFT PLATFORM TRUCKS—

Four-Wheel

A truck equipped with four rigid wheels at the four corners and cannot be steered. If, however, the wheels are mounted one on each side, with one pair larger than the other, the truck can be swiveled on the larger center wheels. Other wheel arrangements for this type of truck are available.

Care must be taken in loading this type of vehicle, so that weight is not accumulated too heavily on any one corner or the truck may tip over. Trucks of this type are not as stable as either the fifth-wheel steer or six-wheel types.

I-B-1-e-4. NON-LIFT PLATFORM TRUCKS—

Fifth-Wheel Steer

The fifth-wheel of this type of running gear is not a true wheel. The two rear wheels are fastened to a rigid axle. The front wheels are mounted on an axle to which a draw handle is attached for steering as a unit through a king pin, bearing plate or ball raceway.

The truck can be turned in its own length, but not in as small a circle as the true four-wheel and six-wheel types. It is difficult to maneuver when being pushed backwards.

I-B-1-e-5. NON-LIFT PLATFORM TRUCKS—

Six-Wheel

These trucks balance on their two center wheels and have either casters or wheels at the four corners. They are highly maneuverable, can be pushed equally well in either direction and, if the load is well balanced, can be easily turned in half their length.

They are widely used in the warehousing and textile industries.

1-B-2. Skid Platforms

(See Under V—SELF-LOADING SYSTEMS)

1-B-3. Powered Industrial Trucks

A group of trucks which are, for the most part, powered models of industrial hand trucks. Not included here are the trucks associated with the handling of unit loads on skids or pallets, for which see V—SELF-LOADING SYSTEMS.

APPLICATION

Used in hauling a wide variety of materials over longer distances than are possible with manually-propelled equipment. Typical types are:

- a. Powered Wheelbarrow
- b. Powered Three-Wheel Hand Truck
- c. Powered Non-Lift Platform Truck

I-B-3-a. POWERED INDUSTRIAL TRUCKS—

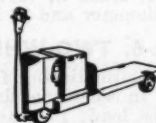
Wheelbarrow

Powered wheelbarrows are similar to their manual counterparts with three, instead of two, wheels; the extra wheel being swiveled for steering.

Capacities up to 18 cu. ft. and 1000 lbs. are available. Pneumatic tires are used and the power usually provided by a gasoline engine. They are especially useful where there are ramps.

I-B-3-b. POWERED INDUSTRIAL TRUCKS—

Three Wheel



There are no two-wheel powered trucks. A third wheel is needed to help carry the added weight of the power unit. Both riding and non-riding types are available.

I-B-3-c. POWERED INDUSTRIAL TRUCKS—

Non-Lift Platform



A group of powered industrial trucks designed purely for hauling. The operator usually stands or sits on the truck while it is in motion and its speed is, therefore, greater than that of a man walking. Electric, gasoline and gas-electric models are available.

Two types of frames are used:

1. **Drop-Frame Type** with a carrying platform close to the ground, and the driving mechanism and controls above the level of the platform. Capacities range from 1000 to 6000 lbs. A special model is seen in the baggage truck which has a drop frame, but it also has driving mechanism and controls at both ends; instead of at one end only, as in more conventional types.

2. **Straight-Frame Type** has its driving mechanism under the carrying platform. If manually loaded, this type requires a higher lift than the drop-frame type.

APPLICATION—Used to haul heavier loads over longer distances than is possible with man-power alone.

1-B-4. Trackless Trains

Often referred to as Tractor-Trailer Trains, this is a system of handling, comprising a detachable power unit (a tractor) and one or more burden carriers (the trailers).

APPLICATION

Used in hauling miscellaneous loads over considerably longer distances than are practical with other hauling systems. The fact that the power unit is separate from other elements permits it, when the work is well planned, to keep active by serving more than one train of trailers.

A tractor-trailer train is able to maneuver well through relatively narrow aisles, doors and passageways. Although the train performs well on up grades, means must be provided to keep the trailers from getting out of line on declines. It frequently is integrated with unit-load systems; as, when loaded pallets are placed on trailers by a crane, fork truck or other mechanical means, or when the unit loads are created on pallets placed on the trailers.

I-B-4-a. INDUSTRIAL TRACTORS

Self-propelled, trackless vehicles which haul one or more trailers. The types used in and around plants, wharves, warehouse, terminals, etc., usually are wheel-mounted; whereas the caterpillar-tread variety are employed in heavy, outdoor hauling. Several light-duty tractors, powered by electric batteries or gasoline engines, have been developed.

It should be observed that almost any powered industrial truck, such as a fork truck, can be equipped with a coupling and used to draw trailers. We are here considering, however, machines designed primarily for traction purposes. These are classified as:

1. Light-Duty
2. 3-Point Contact
3. 4-Point Contact

I-B-4-a-1. INDUSTRIAL TRACTORS—Light Duty

These small self-propelled tractors are used for many hauling operations, including trailer trains, in locations where the heavier types would not be economical. They are made in both non-riding and riding varieties.

Like many other small trucks, they are frequently referred to as being of the "walkie" family, a designation which has become too limiting, since riding models have been brought out.

I-B-4-a-2. INDUSTRIAL TRACTORS—

3-Point Contact

This type of tractor usually is lighter, has less drawbar

pull, and is more maneuverable (in that it can turn in a shorter radius) than the 4-Point variety. While it is generally built with three wheels, there may be more. The rear wheels can be dual, and the front steering element may be made up of two wheels which turn and steer as a single wheel.

Electric battery, gasoline, diesel, gas-electric or diesel-electric models are offered. The operator may be located either in the front, center or rear. Solid or pneumatic tires are provided.

APPLICATION—Because of its maneuverability and relative narrowness, it is usually employed to draw trains of trailers inside plants, warehouses, terminals, etc.

I-B-4-a-3. INDUSTRIAL TRACTORS—

4-Point Contact



ELECTRIC



GAS

These self-propelled vehicles may be equipped with four or six wheels, arranged to provide rear or front and rear wheel steer. They generally are heavier and have greater drawbar pull than the 3-point models. They also are available in the same choices of motive power as the 3-point type.

APPLICATION—Because of their heavier construction and less maneuverability, they usually are employed in open yard work, on wharves, and similar locations.

I-B-4-b. INDUSTRIAL TRAILERS

Load-carrying vehicles which, when equipped with some kind of coupling device, can be made up into trains for hauling by a powered tractor. Several different types are used.

The following classification is based on the running gear employed, this being the element which is most important from the standpoint of the trains "trailing ability."

1. Balanced
2. Caster Steer
3. 4-Wheel Steer
4. 5th-Wheel Steer

I-B-4-b-1. INDUSTRIAL TRAILERS—Balanced

These trailers are equipped with four wheels, usually with swivel-end wheels and larger center wheels. They are highly maneuverable, but must be properly coupled to trail well.

Frequently employed in plants and terminals for hauling light loads.

I-B-4-b-2. INDUSTRIAL TRAILING—Caster Steer

Two caster wheels at the front end, and two rigid wheels at the rear, comprise the running gear. These trailers are highly maneuverable, but there is a tendency for them to "creep" slightly when being hauled in trains.

They are not reversible; that is, they cannot be coupled together and hauled from either end of the train. Employed in terminals and industrial plants.

I-B-4-b-3. INDUSTRIAL TRAILERS—4-Wheel Steer

These trailers are equipped with four wheels of equal size, with front and rear axles mounted on fifth wheels—or the wheels are mounted on knuckle steers and all four connected by cross linkages, so that they steer simultaneously. They have a draw bar which can be attached to either end.

This is the most accurate trailing vehicle of the tractor group. The train can be hauled from either direction.

I-B-4-b-4. INDUSTRIAL TRAILERS—

Fifth-Wheel Steer

Trailers of this type employ the conventional 5th-wheel steer. They do not trail as accurately as the 4-wheel steer or caster-steer varieties, but more accurately than the balanced wheel type. They are usually employed for hauling heavy loads over long distances.

For Names and Addresses of Manufacturers of Equipment Described at These Pages See DA, Feb., 1953, Pages 55 to 100

2

Elevating Systems

Means of lifting and lowering materials vertically, or at very steep inclines, by machines which operate either with continuous or with intermittent motion.

2-A.

CONTINUOUS MOTION

Elevators which operate vertically with continuous motion and, therefore, discharge their loads in an almost steady flow. There is but one general type in this category, Vertical Conveyors.

2-A-1 Vertical Conveyors

Conveyors as a group included in Section 3—CONVEYING SYSTEMS.

However, those which operate vertically, or at very steep inclines, fall in the category of ELEVATING SYSTEMS.

All vertical conveyors are powered and are of the chain type, although some also can be made with a belt. They can be designed to load and unload automatically and, some, to both lift and lower their loads.

Vertical conveyors frequently are part of a system employing other types of materials handling equipment. They must be engineered to fit given conditions. The following are distinctive types:

- | | |
|-----------|-----------------------|
| a. Arm | c. Push-Bar |
| b. Bucket | d. Suspended Carriage |

2-A-1-a. VERTICAL CONVEYORS—Arm

Powered, vertical conveyors employing two or more endless chains to which are attached regularly spaced, horizontal arms or platforms.

Generally designed only to lift; in which case the arms or platform discharge their loads after passing over the head end and are, therefore, upside down on the return trip. Arms may be straight for carrying flat-surfaced goods or curved to accommodate such articles as barrels and rolls.

When designed to lift, they can pick up loads from slotted surfaces through which the arms pass in rising. Those which lower their loads, can discharge them on similar surfaces. Pivoted arms can be provided; which are tripped during elevation and, thus, discharge their loads on the same side as they receive.

Speeds are relatively slow—30 to 60 ft per min—depending on the product being handled and the methods used in feeding and discharging.

APPLICATION—Widely used for elevating bags, bar-

rels, cartons, rolls of paper and textiles, and similarly packaged articles. Light platform or tray models are used for transferring papers and light loads between floors in offices and plants.

2-A-1-b. VERTICAL CONVEYORS—Bucket

Powered, vertical elevators employing one or more endless chains, or an endless belt, to which are attached regularly spaced buckets.

Materials are discharged after the buckets have passed over the head-end of the conveyor in one of four ways:

1. Centrifugal discharge, by running the machine at relatively high speeds—150 to 400 ft per min, depending on the nature of the product.

2. Continuous discharge, by using buckets with chute-shaped bottoms, so that, when the material is just past the head-end, it falls by gravity onto the bottom of the preceding bucket; from there it passes to another conveyor, to a chute, or drops into a receptacle. Maximum speed is 100 ft per min.

3. Gravity discharge, by having a deflecting idler on the discharge side to catch the material and further direct its flow.

4. Tripping discharge, by using pivoted buckets which rise vertically and then move in an inclined or horizontal direction to the point of discharge, where they are tripped and empty their loads. The most usual type of portable machine has centrifugal discharge.

APPLICATION—Extensively used to elevate loose, free-flowing materials such as coal, chemicals, ores and grains. These machines are frequently tied in with other types of conveyors and chutes.

2-A-1-c. VERTICAL CONVEYORS—Push-Bar

Powered, vertical conveyors employing two endless roller chains between which are mounted regularly spaced cross members or bars; usually lengths of pipe or tubing. The bars run parallel to, and above, a slide or roller bed at a height dependent on the size of the item to be lifted. Horizontal sections are usually employed to feed and remove materials.

Guards must be provided to keep the loads from falling off the conveyor during elevation. Height, spacing and speed (as high as 9 ft per min) of bars must be engineered to fit the product to be handled. Portable models which operate at sharp inclines are available.

APPLICATION—Used primarily for elevating uniform packages in canneries, food processing and bottling plants.

2-A-1-d. VERTICAL CONVEYORS

—Suspended Carriage

Powered vertical conveyors employing two endless roller chains between which are regularly spaced horizontal devices with pivoted hinges for carrying suspended platforms or trays, which remain horizontal on both the lifting and the lowering sides of the machine. Horizontal as well as vertical paths of travel can be provided.

Loading and unloading usually are done by hand, but can be made automatic. Portable models are not offered.

APPLICATION—Used in manufacturing plants to handle small units (such as tote-boxes and pans) and in wholesale houses, paper converters and textile plants for moving light loads.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1953, Pages 55 to 100

2-B. INTERMITTENT MOTION

Elevators which operate vertically with intermittent motion and, therefore, do not discharge their loads in a steady flow. The lifting-lowering element follows the same vertical path in both directions. The following are typical:

1. Fixed-Arm Cranes
2. Fixed-Boom Derricks
3. Fixed Hoists
4. Winches
5. Stackers
6. Levelers
7. Elevators

2-B-1 Intermittent-Motion Elevators—Fixed-Arm Cranes

Cranes, as a group, are included in Section 4—TRANSFERRING SYSTEMS. There are, however, some types with fixed arms which provide means of supporting a lifting device, such as a hoist, to elevate materials vertically and cannot move the load horizontally. Cranes of this type are:

- a. Wall Cranes
- b. Floor Cranes

2-B-1-a. FIXED-ARM CRANES—Wall Cranes

Cranes with fixed arms, usually of the jib type, which are rigidly mounted on walls or columns as supports for a hoisting device.

APPLICATION—Frequently found in machine shops for lifting and positioning work or dies, maintenance departments, and over hatchways or outside buildings for raising materials.

2-B-1-b. FIXED-ARM CRANES—

Floor
Cranes



Cranes, usually of the pillar or goose-neck types, mounted on the floor and serving as an overhead support for a hoisting device. Some models are so constructed that the arm itself does the lifting. Portable models are designed primarily for lifting and lowering loads and not for transporting them.

APPLICATION—Used for the same general purpose as the wall types. Portable models are more widely used than those permanently installed.

2-B-2 Intermittent-Motion Elevators—Fixed-Boom Derricks

Derricks as a group are to be found in Section 4—TRANSFERRING SYSTEMS. Certain types with fixed booms provide vertical motion only and are, therefore, included here. Pole, rigid A-frame, and tripod derricks can be so set up that they act as fixed supports for hoisting tackle. Winches are generally employed as the lifting element. Portable

models are available, but are not intended for transporting their loads.

APPLICATION

Although most widely used in construction operations, they also are employed in warehouses and other locations for lifting loads vertically.

2-B-3 Intermittent-Motion Elevators—Fixed Hoists

A hoist is a mechanical device, usually mounted overhead, which lifts or lowers suspended loads vertically. Hoists are used with monorails and cranes as the elevating element, (See Section 4—TRANSFERRING SYSTEMS). They also can be rigidly mounted to provide vertical-lift only. There are four types:

- a. Manually Operated
- b. Air Operated
- c. Electrically Operated
- d. Whip Hoists

2-B-3-a. FIXED HOISTS—Manually Operated

Fixed hoists which are actuated by manpower. There are five types:

1. Block and Tackle
2. Ratchet
3. Differential
4. Screw Geared
5. Spur Geared

2-B-3-a-1. MANUALLY-OPERATED FIXED HOISTS—Block and Tackle

Hoisting mechanisms consisting of one or more grooved pulleys or sheaves mounted in a frame, which is provided with a rope, suspension hook, eye or strap. The rope passes over the pulleys or sheaves, and provides the means of supporting the load and of applying the necessary man power for elevating it.

APPLICATION—This simplest of all hoisting devices is still widely used for relatively light lifting tasks.

2-B-3-a-2. MANUALLY-OPERATED FIXED HOISTS—Ratchet Types

Known also as Pullers, the manually-operated chain hoists employ a ratchet handle, a sprocket, a chain and hooks for suspending the hoist and the load.

APPLICATION—These one-man machines are used in maintenance and repair work; as in lifting machines or their parts. Hoisting speeds are slow—from 3 in. to 4 ft per min. Capacities range from $\frac{1}{4}$ to 15 tons.

2-B-3-a-3. MANUALLY-OPERATED FIXED HOISTS—Differential Types

Chain hand hoists employing an endless chain which runs over two sets of sheaves. There is an upper, or differential, sheave and a lower sheave. The latter is supported in a pendant portion of the chain, which is provided with a yoke from which is suspended a hook for supporting the load.

Raising and lowering are accomplished by pulling on the proper side of another pendant loop in the endless chain. Loads are prevented from falling, when the operator releases the chain, by the friction in the gear system.

It is the least expensive but, also, mechanically the least efficient—25 to 30 percent—of the hand-chain hoist group.

APPLICATION—Used throughout industry for performing intermittent lifting operations where speed is not a factor and infrequency of performance does not warrant investment in more expensive types.

2-B-3-a-4. MANUALLY-OPERATED HOISTS

—Screw-Geared Types

Known also as worm-gear hoists, these hand chain-hoists employ two chains. An endless chain runs over a grooved wheel and is pulled by hand to raise and lower

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1953, Pages 55 to 100

2—Elevating Systems, cont.

the load. The wheel is mounted on the shaft of a worm gear which engages another worm, on whose shaft is mounted a sheave over which runs a second chain. The open ends of this chain are attached to a clevis with a hook from which loads are suspended.

Although more expensive than differential hoists, this type is more efficient, but slower. It operates very smoothly in capacities from $\frac{1}{2}$ to 3 tons. Friction in the gear systems furnishes braking.

APPLICATION—Used generally throughout industry where slightly greater efficiency justifies the increased cost over the differential type.

2-B-3-a-5. MANUALLY-OPERATED HOISTS

—Spur-Gear Types

Hand chain-hoists employing two chains. The hand chain is endless and runs over a sheave which, in turn, actuates a mechanism composed of triple gears—planetary or gyratory—enclosed in a gear box. The gear system actuates the load sheave over which runs the load chain, at free end of which is attached a load hook.

This is the most expensive but, also, the most efficient type of geared chain hoist—as high as 85 percent. It is, also, the fastest type of hand chain hoist—capacities as high as 40 tons are available.

APPLICATION—For hand-hoisting work where both speed and mechanical efficiency are desirable factors to offset the investment.

2-B-3-b. FIXED HOISTS—Air Operated Types

Often referred to as Pneumatic Hoists, their lifting element is a mechanism actuated by compressed air.

Air hoists have distinctive advantages. They are simple to operate, require little maintenance, give excellent speed control and are non-sparking. They are, however, relatively more costly to operate than electric hoists because of loss of efficiency in compressing and transmitting compressed air. There are two types:

1. Air Cylinder
2. Air Motor

2-B-3-b-1. AIR-OPERATED HOISTS

—Air-Cylinder Types

Hoisting devices employing a cylinder, piston and valves. The actuating medium is compressed air, its flow controlled by an operator's valve. Single acting, air-balanced and double acting types are offered.

When pendant mounted, air-cylinder type hoists use considerable space above the height of lift. But when mounted horizontally, they require but little headroom.

APPLICATION—They are widely used in foundries and chemical plants because of their sensitive controls or their non-sparking feature.

2-B-3-b-2. AIR-OPERATED HOISTS

—Air-Motor Types

Air hoists in which a motor, actuated by compressed air, comprises the lifting mechanism. This type requires less headroom than the pendant air-cylinder type and has, therefore, a longer lifting range.

APPLICATION—The same general uses as the air cylinder type, but the extreme sensitivity of control—from creeping to full speed—and low headroom, makes this type the choice where these features are desirable.

2-B-3-c. FIXED HOISTS—

Electrical
Types



Electrically operated hoists consisting of an electric motor, gear system, a chain and sprocket or a cable and drum, brakes and controls.

The operator can control the hoist either from near the machine (pendant-rope or pendant push-button) or from a distance (remote push-button or electronic). Fixed electric hoists are equipped with a hook or with lugs for overhead installations.

APPLICATION—Chain hoists are used for medium-duty lifting, while cable (wire rope) hoists are for heavy-duty work, capacities up to 12 tons being available.

Widely used to lift many kinds of materials vertically more speedily than with other types and without, of course, any physical effort on the part of the operator.

2-B-3-d. FIXED HOISTS—Whip Hoists

Although these hoists are electrically powered, they have a unique feature which places them in a class by themselves. A whip hoist is a cable hoist so constructed that the load can be lifted at a considerable angle from the vertical without injury to the cable, as would be the case with conventional type hoists.

Models with 30 deg leeway are available. Although usually trolley-mounted, they can be installed as stationary, overhead hoists.

APPLICATION—Especially useful in increasing the reach of a cable hoist, so that materials can be picked up from locations which are not directly under the load hook.

2-B-4 Intermittent-Motion Elevators—Winches

Winches are hoisting machines, usually floor mounted, employing one or more drums, a manila rope or a wire cable, and a means of turning the drum so that it will revolve and wind the rope or cable on itself. Based on the power employed, winches are classified as:

- a. Manually Operated
- b. Electric Motor Operated
- c. Fuel or Steam Engine Operated

2-B-4-a. WINCHES—Manually-Operated Types

Winches powered by hand. Several methods are used to apply the manpower—a hand crank wheel or a hand chain wheel being the most usually employed.

APPLICATION—For lifting or, by combining with pulleys or sheaves, for moving relatively light loads in situations which do not warrant investment in speedier, more efficient hoisting equipment.

2-B-4-b. FIXED WINCHES—Electric Types

Electric winches are similar in construction to electric cable hoists, except as to the mounting used. Instead of having top hooks or lugs, winches are equipped with suspension frames suitable for floor, wall or ceiling mounting.

The hoist drum may be either single or double reeving. Specially constructed, non-spinning wire is used to prevent the load from turning during elevation. By running the cable or cables over different arrangements of sheaves or pulleys various lifting, lowering and pulling motions can be secured. Capacities up to 3 tons.

APPLICATION—Used either alone or with cranes and derricks and with sheaves, to open heavy furnace doors, in loading and unloading ship's cargoes, in assembly-line operations and, horizontally, as car pullers.

2-B-4-c. FIXED WINCHES—

Fuel or Steam-Engine Operated Types

Winches of this type are powered by diesel, gasoline or steam engines. They are sturdily constructed for heavy duty.

APPLICATION—Used largely for outdoor work, as on construction jobs, at ship terminals and on ships themselves combined with various types of cranes and derricks.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1953, Pages 55 to 100

2-B-5 Intermittent-Motion Elevators —Stackers

Known also as Tiering Machines and Portable Elevators, Stackers are elevating machines employing a frame structure with two masts, or posts, between which moves a carriage with a cantilever platform or other supporting device. A base extends under the load and, thus, supplies stability.

Although these machines fall in the elevator group they are not in the same category as Freight Elevators (See 2-B-7, below). They are, in most instances, portable but not self-propelling. They were the prototype of the high-lift platform and pallet machines included in Section 5—SELF-LOADING SYSTEMS.

Stackers may be manually or electrically powered, the latter receiving their current from a light or power line in the work area. The masts may be rigid, hinged or telescopic to meet given requirements.

The bases of stackers may be either fixed or revolving, the latter permitting loads to be placed on the machine from one direction and removed from another. Different types of platform include plain or roller surface, side or end dumping, and others.

APPLICATION

Although stackers have been displaced in most instances where unit-load handling methods have been adopted, they are still used where these systems are not applicable. They also are used in maintenance work—as in changing electric light bulbs, repairing overhead pipes and fixtures, etc.

2-B-6 Intermittent-Motion Elevators —Levelers

Mechanism designed to raise and lower loads a few feet. They may be manually operated, or electrically powered with mechanical or hydraulic lifting mechanisms.

APPLICATION

Usage has divided these levelers into two types—floor levelers and work levelers. Floor levelers are intended to raise loads to compensate for differences in floor levels. Work levelers are made to elevate, lower or hold work at convenient levels.

Since the advent of mechanized handling, floor levelers have been widely used in old buildings to eliminate the need for ramps. They also are employed to lift loads to motor carrier beds, either from ground level or where docks are not sufficiently high.

Work levelers are useful in feeding materials to and from machines in production lines. They are especially useful when arranged to lift and lower automatically when such items as sheets of metal or fibreboard are being handled and the stock pile diminishes or increases.

2-B-7 Intermittent-Motion Elevators

Mechanical devices designed to lift and lower materials in the same vertical path of travel and with their loads supported on carriers.

Elevators of this type are usually permanent installations. They are available in practically any size, capacity or speed. Typical elevators are:

- a. Dumb Waiters
- b. Skip Hoists
- c. Freight Elevators

2-B-7-a. ELEVATORS—Dumb Waiters

Small, usually manually-operated, elevators employing an endless rope, sheave and carrier or tray.

APPLICATION—A low investment type of elevator for moving relatively light loads—papers, blueprints, etc.—between floors of offices, plants and warehouses.

2-B-7-b. ELEVATORS—Skip Hoists

Originally, a system of handling used in coal mines consisting of a small car—a skip—mounted on wheels so that it runs on inclined tracks and is pulled by a rope or cable actuated by a winch. The skip can be tripped during elevation and thus discharge its load.

The term has been extended to include a method of using skips—cars or buckets—to elevate materials vertically in industrial plants.

The system can be composed of a single, unbalanced skip, a single, counterbalanced skip, or two balanced skips. The skips travel in the same path during ascent and descent and are, therefore, true elevators.

APPLICATION—In addition to their use in coal fields, a box type skip hoist is used for elevating packaged goods in cartons or bales and discharging them from either the same or opposite side received.

The bucket types are widely used in blast furnace operations for lifting charges of ore, limestone and fuel.

2-B-7-c. ELEVATORS—Freight Elevators

Sometimes called Floor-to-Floor Elevators or Lifts, they are used to move freight and other relatively heavy loads between floors of buildings or other locations; as, from a basement to street-level.

Installations are usually subject to regulatory codes, which must be rigidly followed. The following are the usual types:

1. Hydraulically Operated
2. Electrically Operated

2-B-7-c-1. FREIGHT ELEVATORS—

Hydraulic Types

Elevators which are raised and lowered by utilizing the pressure of a fluid contained in a cylinder acting on a piston or plunger. These elevators require no overhead housing for their operating mechanism.

They are designed primarily for serving buildings with up to four stories. Speeds are relatively slow.

APPLICATION—In plants, garages and warehouses of limited heights, where car speed is not too important a consideration.

2-B-7-c-2. FREIGHT ELEVATORS—Electric Types

This is the most widely used type of elevator employed in industry, terminals and warehouses for handling freight between floors of buildings. Their importance has increased with the introduction of mechanical handling and, when inadequate, are frequently bottle-necks in the flow of materials.

During the past few years manufacturers have greatly improved their construction to withstand the severe shocks imposed by heavy handling machines and increased loads. Special models frequently are installed in congested, metropolitan areas for elevating goods from basements to sidewalks.

When roller gravity conveyors are laid on building floors, and on the elevators themselves, they provide a means of accumulating materials before and after loading, and for handling on and off the cars without the use of powered machines.

All elevators of this type must be carefully engineered to meet requirements both as to proposed uses and local building codes.

APPLICATION—In practically all multi-storied buildings where freight or heavy loads are handled.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1953, Pages 55 to 100

3

Conveying Systems

Means of moving materials over horizontal, inclined or declined fixed routes by the force of gravity or by power.

3-A.

GRAVITY CONVEYORS

Devices for lowering materials down fixed declined routes by the force of gravity acting against sliding or rolling friction. There are two types:

1. Sliding-Friction Conveyors
2. Rolling-Friction Conveyors

3-A-1. Sliding-Friction Conveyors

Conveyors in which the force of gravity moves materials against sliding friction. There are two types:

- a. Skids
- b. Chutes

3-A-1-a. SLIDING-FRICTION CONVEYORS

Skids



Portable devices used to slide materials from higher to lower levels.

Skid boards have flat or concaved surfaces, either wood or metal and, usually, guards along the sides to keep materials from falling off, and handles to facilitate carrying.

Barrel skids consist of two runners of wood or metal, which usually are connected by cross members to keep them properly spaced. Hooks may be provided at the upper ends to make the skid fast during use.

These devices are the simplest means of providing declined motion.

APPLICATION — Skids are used for moving light packages or loose materials. The barrel type is intended for lowering barrels and kegs, especially by truckmen, but are also employed in freight car operations and in breaking out merchandise from piles in storage.

Where more permanent equipment is required chutes are installed.

3-A-1-b. SLIDING-FRICTION CONVEYORS—

Chute

Chutes are less general-purpose devices than skids. They usually are designed to convey specific kinds of materials and are permanently installed.

They are economical because of their relatively low in-

itial investment and maintenance cost and they do not require any power. There are three types:

1. Plain Chutes
2. Flexible Chutes
3. Spiral Chutes

3-A-1-b-1. CHUTES—Plain

Plain chutes are straight or curved, and are made with flat or concaved surfaces. Usually constructed of wood or sheet metal, but the surface can be of any other material, such as a plastic, or treated to provide proper friction between it and the material to be moved.

The coefficient of friction of the surfaces in contact determines the incline required to secure free sliding. But it may vary with changes in conditions, as when cartons absorb moisture. The increasing velocity of the sliding material limits the practical length of a plain chute.

When installed for floor-to-floor operation, they are frequently hinged at the upper end and counterweighted so they can be swung overhead when not in use. This is a desirable arrangement, because plain chutes are wasteful of space. They often are used as part of a complete system to provide economical declines.

APPLICATION—Very extensively used to direct the flow of loose or packaged materials and individual articles; as in feeding materials into storage bins, lowering merchandise from one floor to another, and in directing small parts as they are ejected from production machines.

Their use is limited, of course, to materials which can slide and not be damaged by so doing; nor be affected by collisions, should there be a back-up on the line. When packages are to be removed manually, provision must be made to prevent injury to the workers' hands.

3-A-1-b-2. CHUTES—

Flexible



Flexible chutes are those which are so constructed that the flow of materials may be directed to selective discharge points. They are usually tubular, and made of canvas, jointed sheet metal, sections or hose, depending on the kind of material to be handled.

APPLICATION—Widely used for directing the flow of loose, free-flowing materials; as grains and flour, and for bagged goods in such operations as ship loading and unloading, and in moving materials to and from storage receptacles.

3-A-1-b-3. CHUTES—Spiral

Friction chutes whose surfaces, called blades, follow the form of a helix or spiral. Their function is to provide means of lowering materials in a more restricted area and with better control of the rate of fall than can be done with plain chutes.

Spiral chutes usually are made to serve a number of floors, and can be designed with intermediate receive and discharge stations. The blades may have flat or concaved surfaces. They also may be single, double or triple, ar-

ranged around a standpipe, open core or enclosed. The width of the blades and their pitch must be engineered to the materials they are to handle.

APPLICATION—Frequently employed in wholesale establishments for assembling orders from upper floors; also in industry for lowering bagged and packaged goods economically, and with minimum space requirements.

3-A-2. GRAVITY CONVEYORS— Rolling-Friction Type

Devices with rolling surfaces down which materials move over fixed routes by the force of gravity alone. There are three types:

- a. Gravity Wheel Conveyors
- b. Gravity Roller Conveyors
- c. Flexible Gravity Conveyors
- d. Gravity Roller Spiral Conveyors

3-A-2-a. ROLLING-FRICTION CONVEYORS—

**Gravity
Wheel
Conveyors**



Often called Skate Wheel Conveyors, gravity wheel conveyors employ two or more longitudinal frame members which support axles or shafts, each with one or more wheels.

The frame members may be straight or curved and are made of bar stock, angles or channels. The wheels may be set high, flush or low with reference to the frames. When the wheels are low-set, the frames act as guard rails.

Wheels are available in a variety of shapes, materials and diameters. Their spacing can be arranged to meet any condition, but at least three sets must always be under the smallest package to be handled.

Materials to be handled must have at least one smooth surface; although experience has shown that materials in tightly packed paper-wall bags can be conveyed provided the wheels are closely spaced and the line set at a steep pitch.

In general, the pitch necessary for free rolling is dependent on the size of the wheels, type of bearing, the contacting surface and the weight of the product conveyed. It will vary from $1\frac{1}{2}$ to 7 pct for straight sections and possibly double that amount for curves and switches. The correct pitch frequently must be determined by actual test; especially with an untried product.

Y-switches, spur-curves and hinged sections add to the flexibility of their application. Packages move around curves with practically no drag because of the differential action of the outside and inside wheels.

Permanent installations usually are floor-mounted on stands, but they can be set up supported by wall brackets, or hung from the ceiling by hangers. Portable units are used with or without casters supports.

Unless very close wheel settings are used, these conveyors are less expensive than roller conveyors, but they are not usually constructed as sturdily and are, therefore, not used for such heavy duty as the latter. This does not apply, of course, to specially designed wheel conveyors.

APPLICATION—One of the most widely used types of conveyors for handling packaged goods. Short sections are carried on trucks to help the driver in unloading.

In many wholesale establishments lines of gravity wheel conveyors are set up with practically no pitch to serve as a means of pushing cartons with little effort in distributing and picking stock.

Short sections of wheel conveyor are sometimes used

at the two ends of powered conveyors to facilitate feed and discharge.

3-A-2-b. ROLLING-FRICTION CONVEYORS—

**Gravity
Roller
Conveyors**



Conveyors employing two or more longitudinal frames which support shafts on which are mounted cylindrical rollers.

Frames may be bar stock, angles or channels. Rollers may be steel, aluminum, brass, cast iron, magnesium, plastic or maple. They can be set high, flush or low; the last require no guard rails. Types of bearings include plain, ball, grease-sealed, semi- and fully-enclosed.

Curves, spurs, Y-switches and hinged sections are optional. To provide needed differential action on curves, rollers are set radially. The radius of the curve at the center line of the conveyor must be greater than the length of the longest item to be conveyed. Curves are made with two types of rollers—tapered for use with flat-surfaced articles, and dual if two edges rest independently on the rollers.

To roll freely, packages must have one flat surface or their bottoms must have other elements, such as cleats, which will act as runners in the direction of motion. Three rollers must always be under the items conveyed.

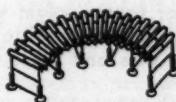
Compared with wheel conveyors, roller types have greater inertia due to the greater mass of rollers and must, therefore, be set at slightly increased pitch. When packages start rolling, successive units move with increased velocities.

Roller conveyors usually are more rugged and, except where wheels are very closely spaced, more expensive. Usually, they cannot handle bags, because these tend to sag between rollers more than with wheels.

Permanent installations may be floor-, wall- or ceiling-mounted. Portable sections are used with or without casters stands.

APPLICATION—Widely used for the same general purpose as gravity wheel conveyors but, generally, for heavier loads, and items which cannot be conveyed over the latter. If the nature of the product to be conveyed is such that neither gravity type can be used, a powered conveyor usually is available that can do the job.

3-A-2-c. ROLLING-FRICTION CONVEYORS— Flexible Gravity Conveyors



Frequently called Accordion Conveyors but often referred to as Extendable and Telescopic Gravity Conveyors because of the two kinds available.

Accordion conveyors have two pantograph-like frames composed of links with rollers mounted between their upper juncture points. When the conveyor is extended, the rollers are moved apart. When used to form a curved section, the ends of the rollers on the inside of the curve are higher than those on the outer edge.

Extendable conveyors, both wheel and roller, are made up of sections which telescope and are pulled apart to form a longer unit. Both kinds are portable.

APPLICATION—Both types are used to provide temporary extensions to conveyor lines, especially in such operations as loading and unloading cars and trucks.

The accordion type has the added advantage of being curvable. Its use is limited to relatively light loads and the amount it can be extended to the sizes of the packages, so that three rollers are always under them.

3-Conveying Systems, cont.

3-A-2-d. ROLLING-FRICTION CONVEYORS

Gravity Roller

Spiral Conveyors



Like gravity spiral chutes, these conveyors are helical but, instead of friction blades, cylindrical rollers form the carrying surface.

Their advantages are that they allow the packages to ride slowly downward without damage. Practically any type of container can be handled. They possess the unique feature of permitting accumulation on the line, and no power cost is involved. They must, however, be carefully engineered for given conditions.

APPLICATION—In general their uses are the same as those of gravity chutes, but they can be employed to lower a greater variety of products.

3-B.

POWERED CONVEYORS

Powered conveyors are means of moving materials over fixed horizontal, inclined and declined routes. The following are distinctive groups:

- | | | |
|----------|-------------|--------------|
| 1. Belt | 3. Chain | 5. Pneumatic |
| 2. Cable | 4. Portable | 6. Screw |

3-B-1. POWERED CONVEYORS—Belt

Powered belt conveyors usually are made with a frame or rails, an endless belt, end rollers, a means of supporting the return portion of the belt, a tension take-up mechanism, and a driving element with motor, transmission and, optionally, a variable speed device.

The belt usually is made of fabric—plain woven cotton, impregnated or coated with material to meet operating conditions. Woven wire and sheet metal belts also are used.

Drive is usually from the head end. The return portion of the belt may be made to carry loads.

Except with certain wire belts, these conveyors must be straight units. Discharge is habitually over the head end because of difficulty in deflecting articles unless the surfaces are smooth.

Amount of incline is dependent upon the characteristics of the material being moved, and the surfaces and speed of the belt. Cleats at regularly spaced intervals improve the possible amount of incline, but complicate automatic feeding.

Fixed or adjustable supports are used for floor mounting; brackets on walls, and hangars from ceilings.

The following types are available:

- | | |
|---------------|----------------|
| a. Slide Bed | c. Live Roller |
| b. Roller Bed | d. Trough |

3-B-1-a. BELT CONVEYORS—Slide Bed

This type of powered belt conveyor—often called Flat Bed or Slider Bed Conveyors—has a flat bed, metal or wood, over which the belt slides. The advantages of this construction are the smoothness of the carrying surface, quiet operation and relatively low initial investment and maintenance cost. However, to overcome the friction between the belt and the bed, considerable power is required and used, therefore, is restricted to comparatively light loads over short distances.

APPLICATION—Extensively used in many industries: Especially where glassware and similar fragile materials are handled; in light production and assembly lines to move articles from operator to operator; in floor-to-floor conveying; in sub-freezing areas where roller types give trouble.

Short sections often are used as “boosters” to restore elevation in gravity lines.

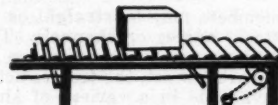
3-B-1-b. BELT CONVEYORS—Roller Bed

The essential difference between these conveyors and the powered slide-bed type is the use of rollers instead of a slide bed. They are more expensive than the latter, require more upkeep, and the riding surface is not as smooth nor the operation as quiet.

However, because of the roller feature, they are able to carry heavier loads over longer distances with lower power requirements.

APPLICATION—Their uses are generally for the same kinds of operations as the slide-bed types, but where heavier articles are to be conveyed over longer distances than feasible with the former.

3-B-1-c. BELT CONVEYORS—Live Roller



Powered conveyors employing an endless belt which runs under and drives rollers in contact with its upper surface.

The advantages of this arrangement are that the speed of the roller conveyor is controlled, articles can be moved up slight inclines, materials can be handled which would injure the surface of a regular belt, and packages can be stopped at any point and released when desired without stopping the conveyor itself.

However, live-roller conveyors are limited to straight-line operation.

APPLICATION—Used in packaging lines where it is desirable to have the feeding of the packages under the control of the operator without having to start and stop the machine.

3-B-1-d. BELT CONVEYORS—Trough

Powered belt conveyors made with either concaved slide or roller beds; the latter usually consisting of regularly spaced sets of three rollers, one horizontal and the other two slanting upward so that the belt is trough-shaped. Rubber coated cotton belting is generally used.

APPLICATION—Employed for handling bulk loose materials such as grains, chemicals, ores and coal; usually over long distances at moderate inclinations.

3-B-2. POWERED CONVEYORS—Cable Conveyors

Powered cable conveyors are those which employ a manila rope, or more usually a wire cable, to actuate a device which is in contact with and drags

the material being handled. There are two general types:

- a. Drags
- b. Overhead Trolleys

3-B-2-a. CABLE CONVEYORS—Drags

Conveyors of this type employ a single cable or rope to which are attached regularly spaced scrapers composed of two semi-circular discs bolted together and fitted around and clamped to the cable. The scrapers ride in a U-shaped trough, through which they drag the material being handled.

APPLICATIONS—Used almost exclusively, and then extensively, for moving loose materials such as coal, crushed stone and ores over long distances. They are not suitable for handling materials which would be damaged by dragging over the bed of the trough.

3-B-2-b. CABLE CONVEYORS—

Overhead Trolley Conveyors

These conveyors are described under Section 1—HAULAGE SYSTEMS. See 1-A-1-a. TRUCK DRAGGING SYSTEMS—Overhead Trolley Types.

APPLICATION—In addition to their use discussed in Section 1, they are employed to carry various kinds of containers and other devices for moving articles—such as trays for small parts or packages and hooks from which to hang such items as cartons in packing rooms.

3-B-3. POWERED CONVEYORS—Chain

Conveyors of this type employ one or more endless chains as the means of either themselves moving the material to be handled or to actuate various kinds of devices to move them.

There are many different kinds of chains, such as roller and flexible, and they may be used alone or with attachments like lugs, flat plates, and clamping devices to meet given requirements. Instead of end pulleys, sprockets or sheaves are employed.

Application—In general, chain conveyors are used for more rugged duty than belt conveyors. Different types are frequently combined to make up a system; which must be engineered if satisfactory results are to be secured.

Typical of the group are:

- | | |
|----------------|--------------------|
| a. Apron | f. Slat |
| b. Drag | g. Stabilized Tray |
| c. Flight | h. Vertical |
| d. Live Roller | i. Trolley |
| e. Pallet | j. Special |

3-B-2-a. CHAIN CONVEYORS—Apron

Apron conveyors are those employing two frames with continuous side rails in whose treads run two strands of endless roller chain between which are mounted metal aprons or pans locked, end-to-end, to form a continuous bed.

When pans are used in place of aprons, the system is referred to as a pan conveyor.

The aprons may be flat, but if the surfaces are concaved they can carry materials up steeper inclines.

APPLICATION—Used primarily for moving finely divided or lump bulk materials, especially if they are abrasive or hot, and which would damage belt conveyors. Perforated pans are used in the food processing industries, in metal manufacturing and in foundries for such processing operations as quenching metal parts, and handling heavy materials, such as scrap.

3-B-2-b. CHAIN CONVEYORS—Drag

Drag chains are conveyors which employ one or more endless chains to move materials over plane or troughed surfaces. There are two types:

1. Package
2. Bulk Materials

3-B-3-b-1. DRAG CHAIN CONVEYORS—Package

Packaged-type drag chain conveyors are relatively light, employing one or more endless chains which carry their burdens either on the chains themselves or on auxiliary devices attached to the chains, such as flat plates, or are fitted with lugs to help lift up inclines.

APPLICATION—Chain conveyors are extensively used in dairies, ice cream plants, bottling works and similar establishments to move milk cans and bottle cases.

Since they can operate around curves without auxiliary power, they are an economical means of moving cartons, pans and other containers.

Also used in bakeries and plants where hot products are to be moved. The almost universal use of flat-top drag conveyors in packaging lines indicates the field for which they are best adapted.

Flexible top chains run easily around horizontal idler discs, but curves are not possible with rectangular-top chains. With such chains, transfers must be made by deflecting the packages over dead plates.

3-B-3-b-2. DRAG CHAIN CONVEYORS—

Bulk Materials

These conveyors employ a single endless chain which runs along the bottom of a trough, and with sufficiently large links to handle the material being moved. Discharge may be over the head end or at intermediate points through controlled openings in the bottom of the trough.

Speeds are relatively low to prevent undue wear, especially when abrasive materials are elevated or lowered.

APPLICATION—Although used primarily for moving loose, bulky materials, such as coal and ashes, they also are employed in the lumber industry for moving logs and sawdust, and in steel mills for transferring lengths of bar stock from cut-off machines.

3-B-3-c. CHAIN CONVEYORS—Flight

Conveyors of this type employ two or more endless chains to actuate devices which move the materials being handled. There are two distinctive types:

1. Push
2. Roller

3-B-3-c-1. FLIGHT CONVEYORS—Push Type

Strictly speaking, these are true flight conveyors because the pushing devices employed actually are vanes or flights. Both single and double chain arrangements are employed and, depending upon whether the flights scrape along or clear the bottom of the trough in which the flights are fitted, are called Scraper or Suspended Flight conveyors.

These conveyors are designed for handling particular materials or products, and usually do not operate at greater than 25 deg inclines.

APPLICATION—Originally designed for, and still extensively used in, moving finely divided or lumpy materials. But the flight principle has been applied, and successfully used, in smaller conveyors. There, they are used for elevating relatively tall articles with small bases, such as bottles and cans, as in filling orders for individual items stored in a basement, and which must be elevated to a higher level for assembling or distribution.

3-B-3-c-2. FLIGHT CONVEYOR—Roller Type

These conveyors employ two lines of endless chains between which are mounted cylindrical rollers which ride clear of the bed.

The materials, usually packaged goods, are carried forward by the advance of the rollers and not because of any rolling action. In fact, the rollers do not turn unless the packages are stopped; in which case, the rollers continue to advance under the restrained load, due to the fact that they are free to turn under the packages.

3-Conveying Systems, cont.

APPLICATION—Widely used in such industries as food processing, bottling, pharmaceutical and chemical, where packaging is an important function; also in manufacturing plants for assembly-line work, where the ability to stop products on the line without having to shut down the system is an advantage.

3-B-3-d. CHAIN CONVEYORS—Live Roller

Live-roller conveyors employ two endless chains to turn cylindrical rollers mounted in a frame.

Two arrangements are employed. In one, sprockets are fitted to the ends of the roller shafts and are turned by the action of the endless roller chain.

In the other, two mitre gears are used at each end of a roller shaft. One gear is attached to the shaft and the other, which meshes with the first, is fitted with a sprocket and is driven by an endless roller chain; thus transmitting motion to the roller.

Power-driven curves are available. The drive is positive and slight inclines possible.

APPLICATION—These conveyors are used much the same as are belt-type live-roller conveyors but, primarily, for moving articles which are hot or which might otherwise damage a belt.

If packages are stopped on this type conveyor, the rollers will slide under them and, also, continue to rotate. If the package would be damaged by such action, a roller flight conveyor would overcome the difficulty.

3-B-3-e. CHAIN CONVEYORS—Pallet

Other names for this type are Carry-All and Carousel.

Conveyors of this type employ one or more endless chains for moving load-carrying devices, called pallets, over fixed horizontal or inclined routes. Many different kinds of pallets are used with this system—flat surface, small dollies, and light four-wheel trucks are examples.

APPLICATION—Used widely in distribution and industry to move materials or articles of various shapes—as in terminals for handling package freight, and in foundries for moving moulds and castings. Their advantage is that their use is not limited to uniform loads.

3-B-3-f. CHAIN CONVEYORS—Slat



These are endless chain conveyors with dual chains, between which are mounted flat wood or metal pieces (called slats) of proper widths, lengths and spacing to meet given requirements.

They are ruggedly built to withstand impact and, because of their relatively smooth surface, can be fed and discharged at points other than their ends.

Cleats can be attached to improve possible elevations, but interfere with any type of automatic feeding.

APPLICATION—Used primarily for moving heavy, non-uniform loads, such as barrels, crates, and miscellaneous freight; especially where they must withstand severe impacts during loading.

3-B-3-g. CHAIN CONVEYORS—Stabilized Tray

Conveyors of this type are composed of frames which are built up of parallel rails, along which trays are moved and transferred by endless chains.

They are designed to run at slow speeds, dependent on the materials being handled and the process through which they are passing.

APPLICATION—Used in heat-treating, drying, baking and similar operations where materials must be exposed to some sort of controlled environment or treatment for considerable time.

The arrangement requires less floor space than would be needed if the trays were all in line.

3-B-3-h. CHAIN CONVEYORS—Vertical Types

The construction and action of conveyors of this type are discussed under Section 2—ELEVATING SYSTEMS. See 2-A-1—Vertical-Type Conveyors, which include the following:

1. Arm
2. Bucket
3. Push Bar
4. Suspended Carriage

APPLICATION—In addition to providing motion, all of these conveyors can be used inclined. In addition, the Tripping Buckets and Suspended Carriage conveyors may be used for horizontal handling.

The Elevating Platform conveyor is a special type of Arm conveyor, which shows how vertical machines can be adopted to motion in other planes.

3-B-3-i. CHAIN CONVEYORS—Trolley Types

The construction and uses of conveyors of this type are discussed under Section 1—HAULAGE SYSTEMS. See 1-A-1a and 1-A-1b for

- a. Overhead Trolley Types
- b. In-Floor Type

APPLICATION—In addition to being used to drag industrial trailers, overhead chain trolley conveyors are employed to carry various devices, such as hooks and trays, for moving many different kinds of materials.

In-floor types are used in assembly-line work, and to assist in moving vehicles up and down ramps.

3-B-4. POWERED CONVEYORS—Portable

Conveyors which are portable models of standard types. Some of them are designed to be self-propelling.

Power may be gasoline or electric, according to the location where the machine is to be used. The following types are available:

- a. Apron
- b. Belt
- c. Bucket
- d. Curvable
- e. Extendable
- f. Flight
- g. Screw

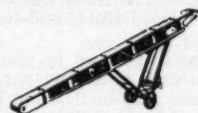
3-B-4-a. POWERED PORTABLE CONVEYORS—Apron

See 3-B-3-a—APRON CONVEYORS for details of construction principles applied to these portable models.

APPLICATION—Same general purpose as the permanent types, but where mobility is an advantage.

3-B-4-b. POWERED PORTABLE CONVEYORS—Belt

Belt



See 3-B-1—POWERED BELT CONVEYORS for details of construction, which are incorporated in portable models.

APPLICATION—Widely used in many kinds of operations, especially in handling packaged goods in cartons and bags. Other applications include such operations as motor truck, freight car, and ship loading and unloading; stowing and breaking-out materials in storage areas.

3-B-4-c. POWERED PORTABLE CONVEYORS—

Bucket

Bucket conveyors which discharge over the end, as described in 2-A-1-b—VERTICAL-TYPE CONVEYORS—Bucket, are made in portable models.

APPLICATION—Widely used for handling coal and similar bulky materials where a permanent installation is not required.

3-B-4-d. POWERED PORTABLE CONVEYORS—

Curvable



Conveyors with wire-mesh belts, which are sufficiently flexible to permit their being made into curves.

APPLICATION—Used in situations where temporary conveyor lines are required, and it is necessary to have it curvable to pass around columns or through passageways. These machines have the distinct advantage of being driven throughout by a single motor.

3-B-4-e. POWERED PORTABLE CONVEYORS—

Extendable



These powered belt conveyors have a pantograph, roller-type frame, and an arrangement at one end for taking up the belt and keeping it taut.

APPLICATION—Used in situations where it is desirable to have a powered belt conveyor which can be extended and is also portable.

3-B-4-f. POWERED PORTABLE CONVEYORS—

Flight

See 3-B-3-c-1—POWERED FLIGHT CONVEYORS for details of construction used in portable models.

APPLICATION—Used for moving bulk materials. Also, for such items, as articles from production lines, where temporary elevation is required.

3-B-4-g. POWERED PORTABLE CONVEYORS—

Screw

Twin-screw conveyors, of the type described below under 3-B-6—POWERED SCREW CONVEYORS, are made in portable models.

APPLICATION—Used primarily for moving bagged goods in car and ship unloading and loading operations, and in stowing and unloading them in warehouses.

3-B-5. POWERED CONVEYORS—

Pneumatic

Pneumatic conveyors are devices for moving materials through a tube by means of air pressure or vacuum.

In a pressure system, the air-compressing element is at the feed end; in the suction system, the vacuum-creating element is at the discharge end.

APPLICATION

Used for moving loose materials such as grain, flour, cotton, nuts, seeds and even coal. The only serious restrictions is that the material cannot be sticky or fragile.

The pressure system is used for longer conveying lines than the suction method. It usually is employed where distribution is made from a central point to a variety of outlets.

In addition to being used for handling bulk materials, both types are employed as moving carriers; exemplified by the pneumatic systems used in offices and plants for moving light articles.

3-B-6. POWERED CONVEYORS—

Screw

Screw conveyors employ one or two continuous screws for moving materials.

The single-screw variety operates with the screw in a semi-circular trough. The material is advanced by being pushed through the trough by and along the blades of the screw.

The twin-screw type is differently constructed. It is composed of two tubes, usually flexible, around which are wound shallow metal spirals. The spiral on one tube is wound in the opposite direction to the other, and the tubes are driven; one clockwise and the other counter-clockwise. When some object, such as a bag, is placed on the conveyor it is moved forward by the advancing spirals.

APPLICATION

The single-screw variety is used for handling bulky loose materials. It also can be designed to move molasses, tar and other sticky materials.

The twin-screw variety usually is made in portable models for handling bagged goods in and out of carriers of all types, and for storage operations.

4

Transferring Systems

Means of transferring materials from one location to another by intermittent-motion machines which carry their loads suspended, lift and lower them vertically, and move them through the air horizontally over either fixed routes or limited areas.

4-A.

OVER FIXED ROUTES

There is but one system of handling where materials are transferred by being lifted and lowered vertically, then moved through the air suspended horizontally over fixed routes. It is known as the Monorail system.

4-A-1. Fixed Route Systems —Monorails

Monorails are systems of handling materials which comprise ceiling-mounted single rail trackage. This is used to support, and provide a fixed path of travel for, trolley-mounted hoists. They elevate and lower loads, and hold them suspended during horizontal travel.

The various types of hoists used with monorail trolleys are described in 2-B-3—INTERMITTENT-MOTION ELEVATORS—Hoists.

A large variety of "below the hook" devices—such as grabs, trays, work carriers and buckets—make this method of handling extremely flexible from the standpoint of the kinds of materials with which it can be used. But, because the loads must follow a fixed path—even though switches, turntables and similar accessories are included—it can not provide the same selectivity of pick-up and discharge points afforded by the limited-area systems.

The outstanding advantage of this method is overhead suspension coupled with relatively low installation and investment costs.

Monorails are engineered to a given job. There are two types, based on the means used to propel the trolleys along the rails;

- a. Manually Propelled
- b. Power Propelled

4-A-1-a. MONORAILS—Manually Propelled

The trolleys used with this type of monorail either are pushed or pulled along the track by the operator. The trolleys may be plain or geared. The latter is operated by a hand chain, which transmits the force applied by

the operator to the chain through gears to the wheels of the trolley.

The hoisting component of the monorail either may be manual- or power-operated.

APPLICATION—Widely used for moving relatively light loads over short distances—as in passing articles through heat-treating oven, spray booths, and similar processes.

Also extensively used in the meat packing industry; in public cold storage plants for handling carcass meat in and out of refrigerated rooms, on and off elevators, along loading platform, and similar locations.

4-A-1-b. MONORAILS—Power Propelled

Power-propelled monorail systems can be arranged in several different ways—from simple motor-driven trolleys to elaborate machines, in which the operator rides in a cab called a telfer.

One type of trolley is moved by an electrically-driven rubber tire, which contacts and rides along the bottom side of the monorail track. Power is provided throughout the length of the system by bus bar or wire.

APPLICATION—Used for the same general purposes as the hand-propelled systems, but with the advantages of using power; the ability to handle heavier loads over longer distances.

4-B.

TRANSFERRING SYSTEMS

OVER LIMITED AREAS

Machines of this type are not restricted in their operation to horizontal travel of their loads through the air along fixed paths. They are able to position their hoisting element over any selected point and can, therefore, pick up and deposit materials anywhere within the operating limits of the machine.

There are two general types:

1. Derricks
2. Cranes

4-B-1. Limited-Area Systems —Derricks

Derricks are transferring machines comprising a slanting boom with lifting-lowering tackle at the free

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1953, Pages 55 to 100

end. The other end is attached to a mast which is not self-supporting but is held upright by stiff braces or by guy lines.

The boom may be fixed, in which case the derrick can be used only for elevating and lowering loads see 2-B-2—FIXED-ARM DERRICKS.

The types included in the present category are those whose booms can be moved in a vertical plane or swung horizontally, or both. With some arrangements horizontal swing may be as great as 360 deg., but in most constructions it is less.

Derricks may be equipped with hand-operated or powered winches or hoists. Three types are representative:

- a. Stiff-Leg
- b. Guy-Line
- c. Miscellaneous

4-B-1-a. DERRICKS—Stiff-Leg

A derrick employing a slanting boom with hoisting tackle attached to a vertical mast, which is held rigidly upright by two or more members called stiff legs.

The usual construction is to have the mast positioned at the junction point of bottom sills, from the ends of which the braces slant in toward the mast. The angle between the sills may be fixed or variable from 60 to 90 deg, and determines the swing of the boom. Portable models are available.

APPLICATION—Used in construction and marine operations where full swing of the boom is not required. This type also is mounted on trucks.

4-B-1-b. DERRICKS—Guy Line

A type of derrick which has a slanting boom and a mast held in a vertical position by means of guy lines.

If the boom is sufficiently short to pass under the guy lines, 360 deg traverse of the boom is possible; otherwise, the swing of the boom is limited by the locations of the guy lines.

APPLICATION—same general purpose out-door work as the stiff-leg type, and where full-swing is desirable.

4-B-1-c. DERRICKS—Miscellaneous Types

There are a number of different kinds of derricks which closely resemble each other but differ slightly in construction.

A *Pole Derrick* has a combined mast and boom. The pole is guyed, usually at a slant.

A *Shear-Leg Derrick* has two members which act as both mast and boom. They are spread wide at the base and slant toward each other at the top. Between the lower ends is a winch.

An *A-Frame Derrick* also has a shear-leg mast with a cross member toward the bottom. In addition it has a boom which is hinged to the cross-member. This derrick can be moved forward and backward, and the boom can swing through 180 deg.

A *Tripod Derrick* consists of three members which join at an apex, from which the hoisting component—usually a block-and-tackle or hand chain hoist, is attached. This latter type affords vertical motion only.

APPLICATION—All these derricks are used in outdoor operations—yards, marine terminals and vessels. Some are mounted on trucks.

A shear-leg derrick mounted on a truck, and called a gin truck, is used extensively in handling line pipe in and out of gondola cars, and in yard storage operations.

4-B-2. Limited-Area Systems —Cranes

Cranes which employ a mast and a boom differ from derricks, in that the mast is not held in an upright position by stiff-leg braces or guy lines but

is self-supporting, or otherwise held vertical.

Cranes of the different types resemble each other in appearance less than some of them resemble derricks. The following are typical:

- a. Jib
- b. Bridge
- c. Portal
- d. Power

4-B-2-a. CRANES—Jib

A jib crane is one employing an horizontal arm or jib pivoted to a vertical support. It is guyed from its outer end or braced from underneath. The arm carries either a fixed or trolley-mounted hoisting mechanism.

Jib cranes are made in the following types:

1. Wall Bracket
2. Column
3. Pillar
4. Portable

4-B-2-a-1. JIB CRANES—

Wall Bracket



A jib crane which is pivoted so that it can swing through 180 deg. The hoisting component is either fixed at the end of the arm or is trolley-mounted, so it can operate at any point over which the arm can swing.

APPLICATION—Widely used in machine shops and maintenance departments to move machines or parts from one location to another. Can be swung aside when not in use.

A variation of the basic type is a walltraveling crane. The crane is mounted to an upright frame, which rides on two tracks—one set above the other—along the wall. This gives greater flexibility than when the crane is mounted in a fixed location.

4-B-2-a-2. JIB CRANES—Column

This is a type of jib crane mounted on a column which is pivoted top and bottom, so that it can swing through 360 deg. It also is known as a Jib Cantilever crane.

APPLICATION—For the same general purposes as a wall-bracket crane, where full swing is desirable.

4-B-2-a-3. JIB CRANES—Pillar

A type of jib crane in which the horizontal arm is attached to a self-supporting pillar, which can be rotated through a full swing. A variation is to have the arm pivoted at the base of the pillar.

The power to rotate the pillar may be manual or electrical.

APPLICATION—Used largely in outdoor services—such as railroad repair and ship yards—for unloading and loading various kinds of materials.

Particularly useful where full swing is required, and there is no means of pivoting the mast to an overhead structure.

4-B-2-a-4. JIB CRANES—Portable

See 2-B-1-b—FIXED-ARM CRANES—FLOOR CRANES. These cranes, often called Floor Cranes or Shop Cranes, are available with swinging arms, which place them in this category.

4-B-2-b. CRANES—Bridge

Cranes employing a characteristic bridge, consisting of one or more girders on the top or bottom of which operate one or more trolleys.

The manner in which the bridge is supported determines the particular type of bridge crane as:

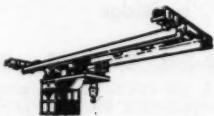
1. Overhead Traveling
2. Gantry

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1953, Pages 55 to 100

4-Transferring Systems, cont.

4-B-2-b-1. BRIDGE CRANES

Overhead Traveling



A bridge crane employing, on the top or the bottom of each extremity of the bridge, one or more trolleys which travel on two parallel, overhead tracks or runways. The hoisting mechanism moves back and forth along the bridge, while the bridge travels along the parallel tracks.

It is possible, therefore, to locate the hoist over any point within the limits of the runways.

Bridge cranes can be made in a wide variety of capacities from a few to several hundred tons, and with both travel and hoisting speeds to fit given requirements. They may be hand-operated—push or hand chain-and-rack operated—or may have one, two or three motors, depending upon which of the components are powered. Selection can be made from different kinds of controls, including cab.

Construction details are not covered here, because they must be engineered to the work to be done.

APPLICATION—An extensively used type of handling equipment, particularly in the steel industry. There the cranes are employed in transferring all kinds of raw materials, work in process, and finished goods; not only in the mills proper but, also, in storage areas.

4-B-2-b-2. BRIDGE CRANES—Gantry

Gantry-type bridge cranes differ from the overhead-traveling type by the relative positions of the bridge and the supporting runways.

A *full-gantry crane* is one with the runways or tracks on the ground, and the bridge is carried high in the air on tall trestles.

In the *semi-gantry crane*, one support for the bridge is a high trestle, as described above; the other is a runway just under the bridge and supported by hangers or brackets on the outside of a building.

All these cranes require less investment than the overhead-traveling type, and can be more easily changed should alterations be required.

APPLICATION—Used particularly in connection with freight car, ship, bulk handling, and similar handling jobs carried on outdoors, alongside buildings, on terminals, and in storage yards.

4-B-2-c. CRANES—Portal

These cranes are supported, as are full-gantry cranes, by tall trestles. But instead of a bridge at the top, portal cranes have a full revolving boom-type crane. The boom usually is arranged so it can be raised and lowered in a vertical plane, so that ships can be loaded and unloaded by luffing.

APPLICATION—Used almost exclusively for shipside loading and unloading operations.

4-B-2-d. CRANES—Power

Power cranes are those which are mounted on some type of self-propelled vehicle—automotive or locomotive.

The first type are called *Automotive Power Cranes*; the second, *Locomotive Power Cranes*.

4-B-2-d-1. AUTOMOTIVE POWER CRANES

Often called *Mobile Cranes* or *Yard Cranes*, they are of the boom-type and, for the most part, full revolving. There are some models with rigid and swivel-type booms; the former with no swing, the latter with about 280 deg traverse.

APPLICATION—The hoisting function is but one which these versatile machines can perform. Their range

of application can be extended simply by changing the front-end operating equipment to a shovel, clamshell, dragline, hoe, or pile driver.

Based on the type of mounting, automotive power cranes are classified as:

- a. Crawler Mounting
- b. Truck Mounting
- c. Wheel Mounting

4-B-2-d-1-a. AUTOMOTIVE POWER CRANES—

Crawler Mounting

The mounting of these cranes consists of two continuous crawler belts made up of tread shoes or links, and driven by the same superstructure engine as operates the boom.

Travel speeds range from ½ to 2 miles per hour.

APPLICATION—Used over relatively short distances where soft-ground conditions would prevent use of other types of mountings.

4-B-2-d-1-b. AUTOMOTIVE POWER CRANES

Truck Mounting



The mounting in this case is a rubber-tired vehicle which is propelled by a different engine than the one used to operate the crane.

Truck mountings may be supported by two or three axles, and the method of driving may be by chains or gear-driven axles. Many different types of cranes are so mounted.

APPLICATION—Used primarily for lighter work than either of the other two types of machines in this general category, especially where mobility is important. They cannot, of course, operate over as bad terrain conditions as the crawler type.

4-B-2-d-1-c. AUTOMOTIVE POWER CRANES

Wheel Mounting



This type of crane is carried on a rubber-tired vehicle which is propelled by the same engine as that which operates the crane. The slanting boom, full swing type of crane usually is mounted on this rather than on a truck mounting.

APPLICATION—Widely used in yard operations, especially where there is firm ground and speed is a factor. This type usually is specified for heavy-duty lifting; while the truck mounted cranes are used for lighter, often emergency work.

4-B-2-d-2. LOCOMOTIVE POWER CRANES

Cranes mounted on powered cars for operation on railroad tracks.

APPLICATION—For heavy crane operations in yards where they are frequently used with industrial railway equipment. Standard gauge cranes of this type are used in railroad construction and maintenance work.

In plants, this type of equipment now is being displaced, in many instances, by the more mobile power cranes.

5

Self-Loading Systems

Means of handling materials by intermittent motion with mobile machines which are self-loading—that is, they can pick up, move horizontally, set down and, in some instances, tier their loads without the need of manual or other external handling. They also are known as Unit-Load systems.

Unit loads may be composed of individual items handled without breaking bulk, as though they were a unit, or of items which are held together by strapping, gluing or other physical means.

Classified according to the kind of load carrier employed, there are two basic systems. But there are other methods, including a modern trend toward the elimination of load carriers, which do not fall in either category, so we have:

- A. Skid Systems
- B. Pallet Systems
- C. Other Unit-Load Systems

5-A.

SKID SYSTEMS

Self-loading systems of handling in which unit loads are carried on skids. The low-lift-platform-skid method was the first true unit-load system devised.

Skid handling frequently is coordinated and integrated with other systems; even with the fork-lift-truck-pallet method, because skids also can be handled by Fork-equipped machines.

The kinds of equipment utilized in these systems are:

- 1. Skids
- 2. Skid Jacks
- 3. Low-Lift Platform Trucks
- 4. High-Lift Platform Trucks

APPLICATION

Extensively used for handling loads which do not remain in storage for long periods, as in certain types of wholesale warehousing, also in locations with low headroom where multiple tiering is not practical.

Still widely used in its first important application—handling flat sheets of paper and cardboard on relatively cheap skids, used as one-way shippers in common carriers.

Although used for multiple tiering, skids are so constructed that their use for this purpose is more restricted than that of pallets.

5-A-1. Skid Systems—Skids

Skids are load-carrying platforms of wood, metal, or both, supported in various way to give sufficient underclearance to admit platform-type handling equipment.

Most skids are characteristically longer in the direction of travel than they are wide.

All of the following types of skids can be handled by lift-platform trucks, but the first two also are handled by special kinds of equipment described under Skid Jacks below.

- a. Live Skids
- b. Semi-Live Skids
- c. Dead Skids

5-A-1-a. LIVE SKIDS

Live skids are dolly-like carriers employing live running gear, such as wheels or casters, and so designed that they can be handled by lift-platform trucks. They can be moved horizontally without the use of a machine.

Their supports are the most expensive of any type of skid.

APPLICATION—Because of their relatively high initial cost, their use is limited to handling very rapid-turnover merchandise, or to situations where maneuverability of the unit load in somewhat restricted areas is an important factor.

They are used in order—picking where they can be moved about manually, then carried by powered skid-handling equipment. They are seldom used for multiple-tiering.

5-A-1-b. SEMI-LIVE SKIDS



As supports, semi-live skids employ two fixed rear wheels and two rigid front wheels.

To make such a skid mobile, the front legs must be lifted clear of the floor. Special devices are used for this purpose—see 5-A-2—SKID JACKS, below.

Semi-live skids are difficult to maneuver in reverse, and are not as stable as those with four-point support. Standard underclearance is 9½ in.; platform widths are 20, 30 and 36 in.; lengths 36, 48, 54, 60 and 72 in.

APPLICATION—Manually powered semi-live skids provide a relatively inexpensive handling method—low

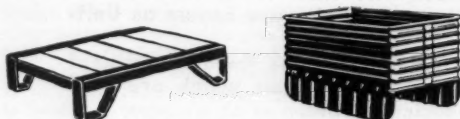
5—Self-Loading Systems, cont.

initial investment and practically no maintenance cost. One jack services several skids.

This method is used largely by wholesalers and manufacturers where storage periods are short and maneuverability is important.

Sometimes used to handle palletized loads in order to take advantage of the larger wheels for manual handling.

5-A-1-c. DEAD SKIDS



Dead skids are platforms of wood, metal, or both, supported by two rigid lengthwise runners, or four fixed corner legs, and with sufficient underclearance to admit the platform of a low- or high-lift truck.

Cheaply constructed skids are made of low-grade lumber to serve as one-way shippers. The type usually employed in active skid operations is sturdily built with a solid platform of wood, bound by a metal frame and supported by metal legs.

There also are all-metal skids, and those with various kinds of superstructures, as stakes, bins, shelves, and with front and side dumping arrangements.

APPLICATION—Many varieties of dead and special superstructure skids are made as stock items. If one cannot be found to fit a given situation, there are manufacturers who will make them to order.

5-A-2. Skid Jacks

Low-lift devices designed to raise the front end of semi-live skids, and to provide running gear under the front end for horizontal motion. There are two types:

- a. Hand Skid Jacks b. Powered Skid Tractors

5-A-2-a. HAND SKID JACKS

A manually propelled device used to elevate the front end of a semi-live skid. It employs one or two closely-spaced wheels and an elevating-steering handle, which acts as one end of a lever with the fulcrum at the wheel axle. At the other end, there is a means of engaging the skid at the center of the front edge.

When the handle is pushed downward, the skid is raised sufficiently to clear its fixed legs from the floor. The jack provides the means of moving and steering the skid.

It is important, from a safety standpoint, to select a skid jack so designed that it locks in place when the skid is elevated, and so that it will not snap out until the operator is ready to spot the skid in place.

APPLICATION—See 5-A-1-b—SEMI-LIVE SKIDS.

5-A-2-b. POWERED SKID TRACTORS

Small four-wheel industrial tractors with a special hydraulically actuated lift arm; which engages the front edge of a semi-live skid, elevates it and moves it horizontally. Battery-powered, operator-lead types are available.

APPLICATION—Used for handling heavier loads over longer routes than are practical with hand equipment. Can also be used with live skids, provided the rear wheels are fixed.

5-A-3. Skid Systems —Low-Lift Platform Trucks

Self-loading trucks, of the platform type, whose lifting mechanism is designed to raise the load sufficiently for horizontal movement.

Most trucks of this type have a lowered platform height of between 6 and 11 in., and a 3- or 4-in. lift. There are three basic types:

- a. Hand Trucks
- b. Powered Hand Trucks
- c. Powered Low-Lift Platform Trucks

5-A-3-a. LOW-LIFT PLATFORM HAND TRUCKS



A low-lift platform truck consisting of a chassis mounted on two fixed rear wheels, and with one or two closely-spaced wheels at the front end controlled by a handle for pulling and steering. These trucks often are referred to as Lift Trucks and Skid Trucks.

A platform, which may be either solid sheet metal or an angle frame, carried on the chassis to which it is connected by a linkage mechanism.

The means employed for actuating the lifting linkage mechanism—and, hence, for elevating the platform—determines the type as:

- 1. Mechanical Lift
- 2. Hydraulic Lift

5-A-3-a-1. LOW-LIFT PLATFORM HAND TRUCKS —Mechanical Lift

The elevating mechanism of these trucks is actuated by exerting downward pressure on the pull handle. Single-stroke and multi-stroke lifting types are available.

In single-stroke machines, full lift is obtained by one downward sweep of the handle. In multi-stroke models, the handle must be "pumped" from four to 12 times to secure full lift.

Single stroke machines are less expensive than multi-stroke types, and are quicker acting, but they require more clear operating space to function. Some models cannot be operated unless the handle is almost directly in line with the machine's longitudinal axis. Others are made to function anywhere within a 300-deg arc.

APPLICATION—For one-man operations, these trucks usually are limited to 2500-lb loads and 150-ft hauls. They are useful in loading-dock operations, where the beds of vehicles and the height of the docks are at approximately the same level.

Also used as emergency standby equipment where operations have been mechanized.

5-A-3-a-2. LOW-LIFT PLATFORM HAND TRUCKS —Hydraulic Lift

Elevation of the platform in these trucks is accomplished by exerting pressure on oil in a cylinder, and through it, to a ram which actuates the lifting mechanism. There are hand-operated and foot-lift types.

In hand-operated machines, the pressure is exerted either by pumping the pull handle up and down or by means of a hand lever. In foot-lift models, the operator works a foot pedal.

APPLICATION—Hydraulic-lift trucks elevate heavier loads more easily than mechanical models. Their general action permits smoother control.

However, any machine which is manipulated by either hand- or foot-pumping is fatiguing if the handling cycle is short and highly repetitive.

5-A-3-b. POWERED LOW-LIFT PLATFORM HAND TRUCKS

Often called Low-lift Platform Walkies, these trucks were developed by motorizing the traction and, later, the elevation of low-lift platform hand trucks. Their distinctive feature is the front end, where there is a small battery, one or two closely-spaced drive wheels, and a steering handle.

Manufacturers have strived to make these machines shorter and shorter. They now have brought them down to within a two-ft length without the load.

Because the early models were operator-led, they were called "walkies." Now that models have been developed on which the operator rides, the two types are best designated as:

1. Non-Ride Types
2. Ride Types

APPLICATION—Widely used where operations are mechanized for handling loads horizontally; especially in loading and unloading common carriers and, in storage operations.

5-A-3-b-1. POWERED LOW-LIFT PLATFORM HAND TRUCKS—

Non-Ride Types

The distinctive features of hydraulically elevated low-lift platform hand trucks have been retained in these machines. There are models with pedal lifts, but most trucks now have motorized elevation and traction.

Capacities range from 2,000 to 10,000 lbs in standard models, 4,000 lbs being average. Speeds are from 3 to 3½ miles per hour—about that of a brisk walk.

APPLICATION—Particularly useful in loading and unloading trucks and freight cars, elevators in multi-storied operations, and for short movements of heavy loads up and down production aisles.

Frequently used to spot load in areas where high-lift machines are putting away.

5-A-3-b-2. POWERED LOW-LIFT PLATFORM HAND TRUCKS—

Ride Type



Before powered hand machines were designed specifically to permit the operator to ride, he frequently operated his machine sitting on the battery box and steered with the handle which was in a vertical position.

Some present models have been developed merely by strengthening the top of the battery compartment, and improving the foot platform for greater safety and comfort. Others have been designed so that the operator stands and controls the machine in that position.

Electric, gasoline and gas-electric models are offered in practically the same capacities as non-ride types, but with slightly greater speed.

APPLICATION—These machines have greatly extended the range of low-lift skid machines, but their use is restricted to operations over well-paved surfaces and, usually, to protected runways.

5-A-3-c. POWERED LOW-LIFT PLATFORM TRUCK

These are self-loading "stand up" type trucks with a low-lifting platform. The undercarriage consists of two or four load-bearing and steering wheels, often called trail wheels and usually about 10 in. in diameter, and two drive-steer wheels under the power unit. The latter are set apart the full width of the machine, and usually are about 20 in. in diameter.

These machines are made so that the operator stands on a platform and faces the controls, power unit, and load during horizontal travel.

Capacities range from 2,000 to 10,000 lbs; speeds vary between four and five miles per hour. Gasoline, electric, and gas-electric types are available.

These trucks provided the first true self-loading system of horizontal handling. From them were evolved the high-lift platform machines. Some manufacturers use the same basic construction for both types of machines, except for the degree of platform elevation.

APPLICATION—Since these machines have higher capacity batteries, and are generally more ruggedly constructed, they are used for more severe service than powered low-lift platform hand trucks.

Their longer lengths (about 40 per cent with a 48 in. load) means that they require more turning space than the powered hand models.

5-A-4. High-Lift Platform Trucks

Platform trucks of the self-loading type which not only can pick up, transport, and set down their loads, but also can tier them without breaking bulk.

There are three types:

- a. Hand Stackers
- b. Powered Stackers
- c. Powered High-Lift Platform Trucks

5-A-4-a HIGH-LIFT PLATFORM TRUCKS—

Hand Stackers

This group of trucks frequently are referred to as Portable Elevators, Tying Machines. Construction details of these machines are given in 2-B-5—INTERMITTENT-MOTION ELEVATORS—Stackers.

All these trucks are manually propelled, but the elevating mechanisms may be mechanically or electrically operated.

The original method of supplying current to the motor was by plugging into the building's line current. More recently, very light-duty stackers—500- to 2000-lbs capacity—have been introduced which have an automotive-type, 6-volt battery.

APPLICATION—Hand-propelled stackers are used for light loads and short distances. Essentially, they are tying machines, and any horizontal moves usually are made by other types of equipment. They are still widely used for stacking bin-skids in storage racks.

5-A-4-b. POWERED HIGH-LIFT PLATFORM TRUCKS—Powered Stackers

Non-counterbalanced, high-lift platform trucks developed by motorizing the traction and elevating elements of hand stackers.

In addition to the conventional masts (rigid or telescopic), carriage, and platform, these models have the characteristic front ends of walkie-type machines—the battery, elevating and driving mechanism, and the lead-steer handle. Most models have stabilizing casters under the corners of the uprights.

A variation in the conventional platform type is a model with arms which can be rolled under a skid, or even under a single-faced pallet, provided there is sufficient clearance. In these arms are nested forks, which are raised to provide elevation. There now are two types of the original so-called "walkies."

1. Non-Ride Types
2. Ride Types

APPLICATION—These machines are used in locations where short turning radii are important—especially in tying at 90 deg—because they require less aisle space for this purpose than other types of high-lift platform trucks.

5-A-4-b-1. POWERED STACKERS—Non-Ride Types

These trucks also are referred to as High-Lift Walkies, Platform Type. Like their low-lift counterparts, they have the traction—and, frequently, the elevating controls as well—in the handle.

Safety features such as brakes, "deadman" cut-offs, limit switches, etc., are provided.

APPLICATION—Used for relatively short hauls—approximately 150 ft, 200 being tops.

5—Self-Loading Systems, cont.

5-A-4-b-2. POWERED STACKERS—Ride Types

In changing powered stackers from the non-riding to the riding type, manufacturers have retained the characteristic features of the original models—notably their wheelbase.

APPLICATION—By relieving the operator of walking, these machines are applicable to longer hauls than practical with operator-led types.

5-A-4-c. POWERED-HIGH LIFT PLATFORM TRUCKS

Except for the degree of lift, these trucks are constructed like their low-lift counterparts. They are more ruggedly built, and are considerably longer than comparable powered stackers.

It was not long after these machines were introduced, and the advantages of stacking unit loads demonstrated, that the high-lift fork truck was developed.

APPLICATION—Used for heavier duty service, and over less even running surfaces, than powered stackers.

Frequently employed in mills and foundries, where loads must be lifted and dumped; but under conditions where the supporting members of the truck under the platform will not interfere with a successful operation.

5-B.

PALLET SYSTEMS

Self-loading systems of handling, in which the unit loads are carried on pallets. The machines used have characteristic forks, so the systems are generally called fork-lift-truck-pallet systems. They frequently are integrated with other systems.

The kinds of equipment utilized include:

1. Pallets
2. Low-Lift Fork Trucks
3. High-Lift Fork Trucks

APPLICATION:

These systems literally have revolutionized handling and, more particularly, storing methods by making it possible to multiple-tier many kinds of materials which cannot be stacked successfully as load-supporting units on skids. Their influence has been felt in all phases of plant layout, and they can be credited for the increasing adoption of unit-stored manufacturing and storage structures.

An example of integration with other systems is the use of stevedore pallets for slinging unit loads over ship side by the ship's gear. It would be easier to list industries in which palletized loads are not being handled today, than those which move their materials on these carriers with fork equipment.

5-B-1. Pallets

Pallets are load carriers consisting of one or two platforms made of wood, metal, or both, and designed to be handled by fork-lift equipment.

Usually, they have three stringers which, with single-platform pallets, act as supports and, with double-platform pallets, as separators between the

two platforms. Compared with skids, pallets are lower—usually about 6 in. overall—with 4-in. vertical openings to admit the forks.

Pallet dimensions are designated by giving, first, their length; the dimension in the direction of the handling forks. In pallets with stringers, this is the stringer-length. Second, the width; which is the length of the top deck boards of wood pallets, or the length in the direction across the forks in other pallets.

Pallets may be classified according to characteristics shown below.

a. Materials of Construction:

1. All-wood.
2. Wood, metal-bound.
3. All-metal—steel, aluminum or magnesium.
4. Wire mesh

b. Fastenings:

1. Nailed with cement-coated, drive screw, annular, clinch- or other type of nail.
2. Bolted.

c. Number of Faces (Platforms or Decks):

1. Single-faced; consisting of but one platform supported by runners (stringers)—usually three.
2. Double-faced; consisting of two platforms, separated by stringers—usually three.

If the pallet is to be used with low-lift fork equipment, sufficiently wide spaces must be left in the bottom decking to permit the load wheels to drop through and make contact with the ground. Correct spacing is 6-8 in., with single load wheels; 8-10 in., with tandem wheels.

d. Reversibility:

1. Reversible; double-faced pallets with the same deck-board arrangement top and bottom.
2. Non-reversible; with different deck-board arrangements top and bottom.

e. Stringer Positions:

1. Flush type; pallets in which the outside stringers are flush with the ends of the deck boards.
2. Wing type; those in which the stringers are set inboard from the ends of the deck boards.

Full-wing types have both top and bottom deck boards overhanging. Semi-wing type have the top deck boards overhanging, the bottom boards flush with the stringers.

The former also are called stevedore or cargo pallets and are extensively used in shipside operations. The latter frequently are used to accommodate the outriggers of stacker-type high-lift machines.

f. Number of Entries:

1. Two-way entry; if the forks can enter the pallet from two opposite sides only.
2. Four-way entry; if the forks can enter the pallet from all four sides. Blocks or posts are used as separators, instead of stringers.
3. Eight-way entry; if the forks can enter the pallet from all four sides and the four corners as well.

g. Special Types:

1. Pallets with special superstructures—such as bins, racks, and shelves—to serve a particular purpose.

h. Expendability:

1. Non-expendable; pallets so constructed that they are expected to be re-used many times.
2. Expendable; those constructed of light wood, plywood, fibreboard, or other light material. They are intended to serve for a short period; as, for example, a one-way shipper.

5-B-2. Pallet Systems

-Low-Lift Fork Trucks

Low-lift, self-loading trucks designed to handle pallets for horizontal movements. Their principal design features consist of two elevating arms or forks, which serve the rear portion of the frame and which carry load wheels near their extremities so hinged that they can be swung up and down by means of an hydraulic elevating mechanism.

The forks are approximately 3 in. thick and, with their load wheels drawn up, can enter the vertical opening of a double-faced pallet. When the forks are fully positioned in the pallet, the load wheels are swung downward, pass through the open space in the bottom deck of the pallet and make contact with the floor. As the hydraulic mechanism continues to swing them downward, they start to lift the pallet.

Load wheels are about 3 1/4 in. in diameter, and may be mounted singly or in tandem; the latter arrangement being an advantage when running over rough floors and bridging the gaps between elevator cars and shaftway sills.

Fork arms are optionally 6 or 9 in. wide. Their lowered height is 3 1/2 in., with a 4 in. lift.

Hydraulic elevating mechanisms only are used in these trucks, which include:

- a. Hand Type
- b. Powered Hand Types

5-B-2-a. LOW-LIFT FORK TRUCKS—

Hand Types



This equipment often is referred to as Pallet Hand trucks, or Pallet Lift Trucks. More accurately, they are low-lift fork trucks, manually propelled.

Characteristic features include single or closely spaced dual steering wheels at the front end and a pull-steer handle. The hydraulic lift may be pump-handle, hand-lever or foot-pedal actuated. Capacities range from 2000 to 6000 lbs.

APPLICATION—The small diameters of the load wheels limit the weight which can be handled by one man to about 1500 lbs, and the distance to within 100 ft.

They are useful for shifting piles of empty pallets, and pallets with light loads, in and out of carriers—provided there is only a slight ramp pitch involved—on and off elevators, and as standby equipment where operations are mechanized.

5-B-2-b. LOW-LIFT FORK TRUCK

Powered Hand Types

Low-lift fork hand trucks whose design has been modified so that they are power driven. Foot-pedal and power-elevated models are available.

The front drive wheel, or wheels, are rubber tired to

provide better traction. Rear wheels may be steel or composition.

There are electric, gasoline and gas-electric models. The two basic types are:

1. Non-Ride Types
2. RideTypes

5-B-2-b-1. POWERED HAND TRUCKS

Non-Ride Types

Popularly referred to as Walkie Pallet Trucks or Motorized Pallet Trucks. They are self-loading trucks with all the characteristics of low-lift fork hand trucks—single or closely spaced dual front wheels, and a steer handle which carries the traction and, usually, the elevating controls.

Capacities range from 4000 to 6000-lbs, and speeds from 2 1/2 to 3 miles per hour. Elevating time is about 3 seconds. Very short models, less than 2 ft longer than the load, have been developed.

APPLICATION—These machines have greatly extended the usefulness of low-lift fork equipment by making it possible for one man to lift the load without fatigue, and to move considerably heavier unit loads than he can handle with manually propelled equipment.

Particularly useful in multi-storied operations, and where there are structural ramps up which loads must be moved, or where dock boards are not level.

5-B-2-b-2. POWERED HAND TRUCKS

Ride Types

Without any basic change in design, low-lift, fork, powered hand trucks of the "walkie" type are altered slightly so that the operator can ride sitting on the battery box, and steering with the lead-handle held almost vertically.

There also are models which have been designed specifically for the operator to ride. In some of these, he sits; in others, he stands while manipulating the machine.

APPLICATION—In addition to being able to handle loads of 6000 lbs, an operator now can move them over considerably longer distances than with machines which require him to walk.

Their high maneuverability and relative shortness make them useful in handling palletized loads over long platforms and in congested aisles. Their light weight and relatively low cost make them ideal feeders to more expensive high-lift equipment, which then can be kept actively engaged in tiering operations.

5-B-3. High-Lift Fork Trucks

Self-loading trucks equipped with forks to handle unit loads on pallets, whose elevating mechanism permits sufficient lift for multiple-tiering of such loads.

There are four basic types:

- a. Hand Stackers
- b. Powered Hand Stackers
- c. Counterbalanced Powered Hand Stackers
- d. Cantilever Fork Lift Trucks

5-B-3-a. HIGH-LIFT FORK TRUCKS

Hand Stackers

These high-lift fork trucks also are known as Pallet Stackers, Tiering Machines. Construction details of these machines are given in Section 2-B-5—INTERMITTENT-MOTION ELEVATORS—Stackers.

Instead of a platform, the type used to elevate pallets has forks. All are manually propelled, but the elevating mechanisms may be mechanically or electrically operated.

The original method of supplying current to the motor was by plugging into the building line current. More recently, very light-duty stackers—500- to 2000-lbs capacity—have been introduced which have an automotive-type, 6-volt battery.

5—Self-Loading Systems, cont.

APPLICATION—Hand propelled stackers are used for light loads and short distances. Essentially, they are tiering machines, and any horizontal moves usually are made by other types of equipment.

5-B-3-b. HIGH-LIFT FORK TRUCKS

—Powered Hand Stackers

These trucks also are known by several other names—Straddle Trucks, Outrigger Trucks, High-Lift Walkies. They are self-loading high-lift fork trucks which were evolved from the hand stacker by slightly changing the design, motorizing the machine, and substituting lift forks for a lift platform.

The outstanding characteristic of these trucks is the rigid frame composed of two arms, called outriggers or straddles, in which are mounted small load wheels. The arms remain in contact with the ground through these wheels even when the load is elevated by the forks, which are carried between the outriggers. This construction obviates the necessity of having to compensate for the weight of the suspended load by counterbalancing.

Models designed for use with double faced-pallets have the arms so spaced that they straddle the outside stringers of flush-type pallets, or run under the overhanging upper deck of semi-wing type pallets.

Models to be used with single-faced pallets have the arms set inboard so they can run under the pallet itself. The load wheels in this latter kind of trucks usually are larger in diameter than those used with the straddle type. There is very little underclearance between the arms and the floor, so that even slight ramps offer operating difficulties.

Capacities are between 2000 and 4000 lbs with loads up to 48 in. long. Lifting speeds have been slow—12 ft per min—but have been improved in recent models.

Rigid and telescopic, but not tilting masts, are offered, and the standard fork lift height is 120 in. There are two types:

1. Non-Ride Types
2. Ride Types

5-B-3-b-1. NON-COUNTERBALANCED POWERED STACKERS—

Non-Ride Type



Pallet-Stacking, Non-Riding Straddle Trucks, High-Lift Walkies are other names applied to these powered stackers.

They are equipped with a steering handle in which the traction, and usually the elevating controls, are carried. The front ends of these machines are characteristically short; almost all current models being less than 3 ft longer than the load. This means they can be operated in very restricted areas.

Storage batteries are the only source of power presently used. Running speeds are between 2½ and 3 miles per hour. These machines weigh, without their batteries, approximately 2,000 lbs.

APPLICATION—Widely used in warehousing and especially in old multi-story buildings. Their light weight and ability to pile from narrow aisles make it possible to mechanize operations where limited capacity floor loads and elevators would prevent the use of more conventional equipment.

Their activity usually is limited to short runs; long hauling being done by low-lift equipment or by ride types.

5-B-3-b-2. POWERED HAND STACKERS

—Ride Type

Known also as Pallet-Stacking Riding Trucks, these high-lift stacker-type trucks are so arranged that the

operator can sit on the battery box and steer the machine by the handle. Another arrangement is such that he stands facing the load with the controls in front of him.

Speeds are slightly greater than with the operator-lead models. The distinctive shortness of these machines is their greatest operating asset.

APPLICATION—These machines have greatly increased the effective operating distance of what used to be manually-propelled equipment, and even of powered stackers which are operator-led; especially in warehousing operations where aisle space is at a premium.

5-B-3-c. HIGH-LIFT FORK TRUCKS

—Counterbalanced Powered Hand Stackers

High-lift fork trucks built along stacker lines but without any straddle or outrigger arms. The front frame is lengthened and the battery (or batteries), the drive, and elevating mechanisms moved further from the fulcrum—the axle of the wheels under the mast. Sufficient additional counterweight is added so that the suspended load is counterbalanced.

The advantage of this type of machine over the true stacker is the absence of outrigger arms.

Telescopic and tilting models are offered. Capacities usually are limited to 2,000 lbs, with 24-in. load centers. Power may be storage battery or gas-electric.

There are two types:

1. Non-Ride Types
2. Ride Types

5-B-3-c-1. COUNTERBALANCED POWERED HAND STACKERS—

Non-Ride Types



Known also as Non-Riding Pallet-Stacking Trucks or Counterbalanced Walkie Trucks, these machines that have all the appearances of the usual walkie type equipment, except that the front ends are longer and there are no support arms or outriggers under the suspended loads. They are steered and controlled by a walking operator.

APPLICATION—Stackers of this type permit the operator to bring the machine directly to the point where he wishes to pick up or set down his load without interference from outrigger arms. This is helpful in placing loads on the tail gates of trucks and similar operations.

These trucks also can be used with flush-type pallets, which can be closely spaced; because there is no space required for the straddle arms.

5-B-3-c-2. COUNTERBALANCED POWERED HAND STACKER—Ride Types

The models which are built with larger platforms—so that the operator stands and faces the load while driving—retain all the characteristic appearances of powered walkies.

However, those with center control arrangements, in which the operator sits over the power unit and faces the load, scarcely can be differentiated from the conventional cantilever type of high-lift fork truck.

They are constructed along lighter lines and use lower capacity batteries; so that the overall dead weight for a given load-capacity is lower. They also are less expensive.

APPLICATION—As a group, these machines fall midway between the powered hand trucks and the conventional high-lift fork trucks (see below). They generally are limited in their application to relatively light loads, in rather restricted areas, and almost exclusively for indoor operations.

5-B-3-d. HIGH-LIFT FORK TRUCKS

—Cantilever Fork Lift Trucks

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1953, Pages 55 to 100

Cantilever, self-loading trucks employing two upright masts between which operates a carriage supporting two, or possibly more, forks and which is elevated by a mechanical or hydraulic lifting mechanism.

Masts may be rigid or telescoping; tilting or non-tilting. Power may be electric, gasoline, diesel, gas-electric or diesel-electric.

They are all of the ride-type. In some, the operator sits; in others, he stands. The location of the controls determines whether the machine is end-control—controls at the extreme end—or center-control—controls between the power unit and the load.

The standard lowered height of masts is 83 in., but, of course, other sizes are available. Extended fork lifts are now offered as high as 16 ft. Capacities are from 1,000 to 60,000-lbs. Appropriate solid or pneumatic tires are mounted, according to the service required. Safe running speeds are provided for lighter weight models but large trucks, which can operate over open roads, attain 25 miles per hour.

APPLICATION—These machines are the backbone of the pallet system of handling. In many kinds of operations, especially in outdoor and in unstored installations, they are the only type of equipment used; being employed for both translation and tiering.

They also are coordinated with all other kinds of handling systems. They are found on docks where ship's gear handles the pallets over shipside, in lumber yards where other equipment carries the loads for long distances and fork trucks are used to do the tiering, and in many other locations.

5-C.

OTHER UNIT-LOAD SYSTEMS

Means of handling unit loads by machines which are not conventional platform- or fork-types, or by accessories which do not require the use of skids or pallets as load-carriers. There are two general types:

1. Special Machines Employing Load-Carriers
2. Special Attachments Not Employing Load-Carriers

5-C-1. Special Machines Employing Load Carriers

Machines which have been developed for handling unit loads on skids, pallets or other load-carriers, but which do not fall in the conventional lift-platform or lift-fork types of equipment.

(Section 5-C will be concluded in the May issue)

6

Parts and Accessories HAULAGE SYSTEMS

Parts and accessories used with the machines included under the classification of Haulage Systems. They are grouped as follows:

- A. Industrial Truck Mountings
- B. Industrial Power Truck Accessories
- C. Miscellaneous Industrial Truck Accessories

While every attempt has been made to be thorough, the listings in this Section are not exhaustive. Photo-electric cells, for example, are not mentioned specifically, yet they could be used profitably somewhere along the line with most handling systems. Many similar items have been omitted because most of them should be engineered into a handling system.

6-A.

INDUSTRIAL TRUCK MOUNTINGS

The running gear used with various kinds of industrial trucks. The following classifications are used:

1. Casters
2. Wheels
3. Tires
4. Bearings

6-A-1. Casters

Industrial casters are wheels with relatively wide faces which are attached to trucks or other objects to facilitate horizontal movement. They may be attached by means of a stem or a flat top-plate and bolts; the latter being the more usual type for industrial applications.

Wheels made of various materials and treads are available to fit given loads, running surfaces, and special conditions; such as where water, oils, chemicals and other corrosive materials are encountered.

There are two basic types of casters:

- a. Rigid Casters
- b. Swivel Casters

Rigid casters consist of a flat top-plate with

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1953, Pages 55 to 100

6-Parts and Accessories, Haulage Systems, cont.

bolt holes or slots and a rigid yoke, called also a fork or a horn, in which is mounted the axle which supports the wheel.

Swivel casters are those which turn through 360 deg about a vertical axle called a king pin or a king bolt. The top plate, with bolt holes or slots, has a centrally located fixed king pin, or a hole for a king bolt, and, on its under side, a ball bearing raceway. The separate fork has a flat base with a ball bearing raceway in the upper side and, usually, a smaller ball bearing raceway in the lower side for a thrust bearing.

Most industrial casters are assembled by a king bolt and nut. Ball bearings are carried in the raceways of the top plate and the fork to support the load. The thrust bearings are carried between the smaller raceway in the under side of the fork and a bearing surface which closely resembles a flat washer.

All these elements are held together in proper relationship when the nut of the king bolt is tightened. Ease of swiveling is determined largely by the amount of lead—the horizontal distance between a line through the axis of the king bolt and the axis of the wheel.

The following are typical caster wheels:

- a. Canvas
- b. Metal
 - 1. Aluminum Alloy, Plain Tread
 - 2. Steel
 - a. Semi-Steel
 - 1. Plain Tread
 - 2. Grooved Tread
 - b. Pressed Steel
- c. Plastic
- d. Rubber-Tired
 - 1. Semi-Pneumatic (Zero Pressure)
 - 2. Solid Rubber
 - a. With Metal Core
 - 1. Moulded-on
 - 2. Pressed-on
 - b. With Steel Side Plates (Discs)
 - 1. Moulded Tire
- e. Wood

6-A-2. Wheels

Wheels for industrial trucks are selected for a given application with the view of meeting the following conditions:

- a. The weight of the load it is to carry
- b. The surface over which it is to travel (wood, concrete, gravel, macadam, asphalt, earth, etc.)
- c. The nature of the load (susceptibility to shock, etc.)
- d. General operating conditions (presence of grease, oil, corrosive chemicals, brine, etc.)
- e. The type of operation (manual pushing or power driving—where traction is important).

The following are typical of the many kinds of wheels available:

- 1. Metal
 - a. Aluminum Alloy, Plain Tread
 - b. Malleable Iron
 - 1. Plain Tread
 - 2. Grooved Tread

c. Semi-Steel

- 1. Plain Tread
- 2. Grooved Tread

2. Moulded Composition with Metal Core

- a. Hard Rubber Tread
- b. Soft Rubber Tread

3. Rubber-Tired Wheels

- a. Pneumatic
- b. Semi-Pneumatic, Zero Pressure
- c. Solid Rubber with Metal Core
 - 1. Moulded-on
 - 2. Pressed-on

4. Spoke Wheels

- a. Steel Rim, Metal Spoke
- b. Steel Rim, Wood Spoke
- c. Wood Rim, Wood Spoke

6-A-3. Industrial Tires

The following types of tires are used with industrial trucks:

- a. Pneumatic—Tire with Separate Inner Tube
- b. Semi-Pneumatic—No Inner Tube, Zero Pressure
- c. Solid Rubber Tires with Metal Rims
 - 1. Moulded-on
 - 2. Pressed-on

6-A-4. Bearings

Devices used to reduce the friction between a wheel and its axle. The following types are available:

- a. Plain
- b. Self-Lubricating
- c. Ball
- d. Roller
- 1. Straight
- 2. Needle
- 3. Tapered
- e. Combination Ball and Roller

6-B. INDUSTRIAL POWERED TRUCK ACCESSORIES

The various accessories used with industrial power trucks are classified as follows:

- 1. Sources of Power
- 2. Storage Battery Accessories
- 3. Miscellaneous Accessories and Supplies

6-B-1. Sources Of Power

The various sources of supplying power to industrial powered trucks are of four general kinds: Electric storage batteries, gasoline and diesel engines, and generating units driven by gasoline or diesel engines. The latter generate direct current to charge the electric storage battery while it is in service on the truck.

These various methods require the following accessories:

- a. Fuels
- b. Storage Batteries
- c. Ready-Power Units

4-1-a. FUELS

Two types of fuel are used to power industrial trucks:

1. Gasoline
2. Diesel Oil

4-1-b. STORAGE BATTERIES

A storage battery is an electro-chemical device which generates electrical pressure (voltage) by chemical action. The make-up of industrial batteries is designated by a symbol of three parts. The first number indicates the number of cells; the next, the type of cell (this varies with different manufacturers); and the third tells the number of plates. Thus, 6 TLM 11 means that the battery is made up of six cells of type TLM, and contains eleven plates.

The ampere-hour capacity of a battery is a measure of the quantity of electricity which the battery is capable of providing.

The materials used in the construction of a battery vary. Two types are used in industrial service:

1. Lead-Acid Type Batteries
2. Nickel-Iron-Alkaline Type Batteries, also called Edison Batteries

4-1-c. READY-POWER UNITS

These direct current generating units driven by a fuel-powered engine and carried on a truck as a means of charging an electric storage battery so it, in turn, can supply direct current to the truck. The charging is done while the truck is in service.

Based on the kind of prime mover used, there are two types:

1. Gasoline-Electric
2. Diesel-Electric

6-B-2. Storage Battery Charging Equipment

Unless a storage battery is charged during service—see 6-B-1-c—READY-POWER UNITS—it must be charged by other means. Generally, it is not satisfactory to charge an industrial storage battery directly from an ordinary direct current line. Some form of charger is needed to supply direct current with satisfactory characteristics, and to control the operation throughout.

The following equipment is available:

- a. Battery Chargers
- b. Battery Accessories

4-2-a. BATTERY CHARGERS

There are two distinctly different methods used to charge storage batteries. According to the equipment used, they are:

1. Motor-Generator Sets
2. Rectifiers

6-B-2-a-1. MOTOR-GENERATOR SETS

A means of supplying direct current to a battery (for the purpose of charging it) which employs a motor—either direct or alternating current, depending upon the source of supply—to drive a direct current generator.

Highly developed controls make this method of charging practically automatic. The system must, of course, be engineered to the type of battery being charged.

6-B-2-a-2. RECTIFIERS

A means of converting alternating current to direct current for charging batteries.

Rectifiers cause the alternating current to pass through a "stack" made up of two materials. One material, of low resistance, permits free flow of current in one direction. The other material, of high resistance, effectively checks the flow in the opposite direction.

The construction of rectifiers is very simple. There is but one moving element—a fan to dissipate the heat generated in the stack. Based on the materials used in the stack, there are two types of rectifiers used in industrial applications:

- a. Copper Oxide
- b. Selenium Oxide

6-B-2-b. BATTERY PARTS AND ACCESSORIES

Reducing a broad and highly technical field to simple elements, from the standpoint of the average industrial user, we have:

1. Connectors
 - a. Cable
 - b. Cable Terminal
 - c. Cell
2. Charging Plugs and Receptacles
3. Charge Controls
4. Cell Fillers
5. Hydrometer Syringes
6. Voltage Testers

6-B-3. Miscellaneous Accessories and Supplies

Many useful accessories time- and labor-saving devices and special supplies are available to extend the usefulness of materials handling equipment, and to insure safe, trouble-free operation. Among the most fundamental are:

- a. Lubricants
- b. Lubricating Systems
- c. Exhaust Neutralizers for Gasoline Engines
- d. Safety Fuel Cans

7 Parts and Accessories

ELEVATING SYSTEMS

The parts and devices used with these systems are classified as:

- A. Elevator Accessories
- B. Hoist Accessories

While every attempt has been made to be thorough, the listings in this Section are not exhaustive. Photo-electric cells, for example, are not mentioned specifically, yet they could be used profitably somewhere along the line with most handling systems. Many similar items have been omitted because most of them should be engineered into a handling system.

7—Parts and Accessories, Elevating Systems, cont.

7-A.

ELEVATOR ACCESSORIES

A number of special accessories are being used in connection with elevating operations. Some of these are described in Section 8 in connection with Conveying Systems, others will be found below. As for Freight Elevator accessories, there are several safety devices and special controls. However, the basic and most frequently used accessories are shown below:

1. Elevator Belting
2. Freight Elevator Accessories
 - a. Doors
 - b. Sills

7-B.

HOIST ACCESSORIES

Most accessory items in this category have to do with special applications or special service requirements. The general list of basic accessories is shown below.

1. Blocks
2. Chain Wheels
3. Current Conductor and Collector Systems
4. Limit Switches
5. Variable Speed Controls
6. Air Compressor Systems
7. Load Carriers
 - a. Grabs
 - b. Hooks
 - c. Slings
 1. Chain
 2. Wire Rope
 3. Woven Wire
 - d. Tongs

8

Parts and Accessories CONVEYING SYSTEMS

Various parts and accessories used with conveying systems, classified according to:

- A. Gravity Systems
 1. Wheel Conveyors
 2. Roller Conveyors
- B. Powered Systems

While every attempt has been made to be thorough, the listings in this Section are not exhaustive. Photo-electric cells, for example, are not mentioned specifically, yet they could be used profitably somewhere along the line with most handling systems. Many similar items have been omitted because most of them should be engineered into a handling system.

8-A.

GRAVITY CONVEYORS

A wide range of efficient accessory items are available for Gravity Conveying Systems, and which will improve their performance. The most common items are listed below:

1. Wheel Conveyors
 - a. Parts (Wheels, Axles, etc.)
 1. Aluminum
 2. Steel
 3. Other
 - b. Complete Sections (Straight, Curves, Switches, Hinged, etc.)
 1. Aluminum
 2. Steel
 3. Other
 - c. Guard Rails
 1. Non-Adjustable
 2. Adjustable

- d. Supports
 1. Non-Adjustable
 2. Adjustable
 3. Stationary
 4. Casters
 5. Ceiling Hangers
 6. Wall Brackets
- e. Package Controls
 1. Flow Controls ("Traffic Cops")
 2. Stops
 3. Counters
 - a. Mechanical
 - b. Electrical
 - c. Electronic
- f. Ball Transfers
 1. Ball Assemblies
 2. Plates or Tables
 3. Shields
2. Roller Conveyors
 - a. Rollers
 1. Aluminum
 2. Brass
 3. Magnesium
 4. Plastic
 5. Steel
 6. Wood

- b. Bearings
 - 1. Ball
 - a. Plain
 - b. Semi-Enclosed
 - c. Fully-Enclosed
- c. Sections (Straight, curves, switches, etc.)
 - 1. Aluminum
 - 2. Magnesium
 - 3. Steel
- d. Guard Rails
 - 1. Non-Adjustable
 - 2. Adjustable
- e. Supports
 - 1. Non-Adjustable
 - 2. Adjustable
 - 3. Stationary
 - 4. Castered
 - 5. Ceiling Hangars
 - 6. Wall Brackets
- f. Package Controls
(See 8-A-1-e above)

- 7. Guard Rails
 - a. Non-Adjustable
 - b. Adjustable
- 8. Supports
 - a. Non-Adjustable
 - b. Adjustable
 - c. Stationary
 - d. Castered
 - e. Ceiling Hangars
 - f. Wall Brackets
- 9. Package Controls
(See 8-A-1-e above)
- 10. Trolleys and other Overhead System Parts and Accessories see Section 9.
- b. Bridges
 - 1. Manual
 - 2. Powered
- c. Controllers
- d. Interlocks
- e. Load-Carriers
(See 7-B-7.—HOIST ACCESSORIES—Load Carriers)

8-B. POWERED CONVEYORS

As in the case of Gravity Conveyors, there are many specially designed accessories in use for Powered Conveyors. Basic accessories are shown below, but a glance at the items listed under Gravity Conveyors is suggested, as some also are suitable for powered installations.

- 1. Belting
 - a. Canvas, Stitched
 - b. Cotton, Woven
 - c. Impregnated
 - d. Heat Resistant
 - e. Rubber Covered
 - f. Stainless Steel
 - g. Woven Wire
- 2. Cable
- 3. Chain
- 4. Magnetic Pulleys
- 5. Rollers, End and Idler
- 6. Power Elements
 - a. Complete Power Units
 - b. Control Boxes
 - c. Speed Reducers
 - d. Variable Speed Drives

- 2. Power (Mobile) Cranes
(For wheels, tires, fuel, lubricants, etc., see 6-B.—INDUSTRIAL POWERED TRUCK ACCESSORIES)
- a. Crane Front-End Attachments
 - 1. For Bulk Materials
 - a. Clamshell
 - b. Dragline
 - c. Orange Peel
 - d. Magnet
 - 2. For Heavy Items
 - a. Hook Blocks
 - 1. With Single Sling
 - 2. With Bridle Sling
 - b. Hooks
 - 1. Hair Pin
 - 2. Special
 - 3. For Loose or Stacked Materials
 - a. Clamps
 - b. Grabs
 - c. Grapples
 - d. Tongs
 - 4. For Containers or Weights
 - a. Concrete Buckets
 - b. Skips
 - c. Tote Box
 - d. Skull Crackers

9 Parts and Accessories TRANSFERRING SYSTEMS

The parts and accessories used with these systems of handling are classified here as those associated with:

- A. Monorail Systems
- B. Crane Systems
 - 1. Overhead Cranes
 - 2. Power (Mobile) Cranes

While every attempt has been made to be thorough, the listings in this Section are not exhaustive. Photo-electric cells, for example, are not mentioned specifically, yet they could be used profitably somewhere along the line with most handling systems. Many similar items have been omitted because most of them should be engineered into a handling system.

9—Parts and Accessories, Transferring Systems, cont.

9-A.

MONORAIL SYSTEMS

Many monorail installations lend themselves excellently to integration with other equipment, dip tanks, heating chambers and so on. Also, there are many special product-carrying accessories. Because many of these are used to solve problems, only the common accessories are shown below.

1. Monorail Track (Straight, cross, switch, curve, turntable and similar sections)
2. Track Hangers
3. Current Distribution Systems
4. Controls
5. Trolleys a. Manual b. Powered

6. Trolley Wheels
7. Trolley Tractors

9-B.

CRANE SYSTEMS

Quite a few accessories are available for Crane Systems. Essentially, they are used for specific applications, some are specially designed. The most widely used are shown below.

1. Overhead Cranes
 - a. Brakes
 1. Hydraulic
 2. Mechanical

10

Parts and Accessories SELF-LOADING SYSTEMS

The devices included here are classified according to:

- A. Fork Trucks B. Unit-Loads

While every attempt has been made to be thorough, the listings in this Section are not exhaustive. Photo-electric cells, for example, are not mentioned specifically, yet they could be used profitably somewhere along the line with most handling systems. Many similar items have been omitted because most of them should be engineered into a handling system.

10-A.

FORK TRUCKS

The parts and accessories pertaining to self-loading machines as industrial powered trucks (wheels, tires, batteries, etc.) are included in 6-B.—INDUSTRIAL POWER TRUCK PARTS AND ACCESSORIES. The following items pertain strictly to the specific types of machines:

1. Low-Lift Fork Truck Accessories
 - a. Skid Platform Adapters
2. High-Lift Fork Truck Accessories
 - a. Special Fork Types b. Fork Extensions
 - c. Special Carriages and Attachments
 1. Extra High-Lift 4. Scoops
 2. Hydraulic Pushers 5. Side Shifting Forks
 3. Revolving Forks 6. Snow Plows
 7. Sweepers
 - d. Back Stops e. Overhead Guards

10-B.

UNIT-LOADS

The following devices are utilized either in creating or facilitating the handling of unit loads:

1. Automatic Pallet Loaders
2. Unit Load Binders
3. Adhesives
4. Adhesive Applicators
5. Tape
6. Tape Dispensers
7. Steel Strapping
 - a. Flat b. Round
8. Strapping Tools
 - a. Flat b. Round
9. Skid and Pallet Storage Racks
10. Carton Shields

11

Parts and Accessories BUILDING MAINTENANCE

The items included here are those accessories used to facilitate materials handling, and those for the maintenance of buildings and properties. They are arranged according to the following operating locations:

- | | |
|------------------------------|------------------------|
| A. Freight Cars | C. Loading Platforms |
| B. Motor Trucks and Trailers | D. Buildings and Yards |

The parts and accessory items listed under these headings are complete within common usage. For example, handling equipment must be maintained but no such equipment is listed, that would go beyond this section.

11-A. FREIGHT CARS —HANDLING

To list all known accessories that can be used in handling freight cars would require too great a broadening of the classification given here.

For example, portable lights are available when loading and unloading freight cars at night or when natural light is too poor. However, such items are special purpose and belong in a more general category. Those commonly associated with freight cars are:

- | | |
|----------------------------|----------------|
| 1. Bulkheads | 4. Car Liners |
| 2. Bulkhead Anchors | 5. Car Prys |
| 3. Car-Door Load Bracers | 6. Car Pullers |
| 7. Yard Switch Engines | |
| (Also called car spotters) | |
| 8. Door Openers | |
| 9. Dockboards | |

11-B. HIGHWAY TRUCKS AND TRAILERS —HANDLING

This is another section that could be liberally expanded when considering accessory items. Some trucks, for example, carry wheel skids, pads, and such items. Because they are normally required for loading and unloading certain types of freight, they are too specific for the list below, which is intended to be more general.

- | | |
|------------------------|--------------|
| 1. Elevating End-Gates | |
| 2. Tail Gate Skids | |
| a. Aluminum | b. Magnesium |
| 3. Wheel Chocks | |
| 4. Dockboards | |
| a. Aluminum | b. Magnesium |
| | c. Steel |

11-C. LOADING PLATFORMS —HANDLING

There is a multitude of items available for platform work that are not listed below. Some shippers, for example, use office dictating machines to aid checking cargoes being loaded or unloaded. Such items really are part of a system and are not included.

- | | |
|--------------------------|------------|
| 1. Bridge Plates (Ramps) | |
| a. Manual (Dockboards) | b. Powered |
| 2. Canopies | |
| 3. Cross-Over Bridges | |
| 4. Elevating Platforms | |
| 5. Communication Systems | |

11-D. BUILDINGS AND YARDS —HANDLING

This classification has been broadened intentionally, but within close limits. For example, for safe handling of goods in storage fire protection is necessary; floors must be kept in good condition or loads being carried can be spilled and damaged, or personnel injured. The following are considered basic:

- | |
|--------------------------|
| 1. Aisle (Floor) Markers |
| 2. Bins |
| 3. Fire Protection |
| 4. Floor Maintenance |
| 5. Sanitation |
| 6. Security |
| 7. Storage Protection |

DA SPECIFICATIONS

LIFT TYPE—Pallet

Lift Type models — pallet, platform and fork — shown on these pages and on Pages 112 and 113 were received too late for publication in their proper alphabetical order. Other specifications are on Pages 26 to 33

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY		Service Weight (Lb.) (Unloaded but including battery)	Operation Type	Power Type	Lift Type	MAST		OVERALL DIMENSIONS (In.)							TURNING RADIUS (In.)						
		Weight (Lb.)	Load Center (In.)					Tilt		Length	Height	Width	Free Lift	Max. Lift Elevation	Lowest Underclearance	With Platform or Forks	Turn in Intersecting Aisles	Minimum Aisle for Right Angle Stacking					
								Forward (Deg.)	Reverse (Deg.)	With Platform or Forks	Without Platform or Forks	With Mast Extended	No Extension Mast										
1	Automatic.....FF-10	1000	24	2737	R	E	PF	Y	2 1/2	12 1/2	88 1/2	52 1/2	170	78	34	68	134	3 1/2	50				
2	.....FF-15	1500	24	2871	R	R	PF	Y	2 1/2	12 1/2	83 1/2	53 1/2	170	78	34	68	134	3 1/2	50			
3	.....RTT	3000	14-24	4000	R	R	PF	Y	5	10	96 1/2	60 1/2	168	83	33	68	132	4 1/2	80 1/2			
4	.....CF-10	1000	24	4776	R	R	PF	Y	3	10	101 1/2	65 1/2	162	83	37	20	132	4 1/2	67			
5	.....CF-18	1800	24	4776	R	R	PF	Y	3	10	101 1/2	65 1/2	162	83	37	20	132	4 1/2	67			
6	.....CF-20	2000	24	4922	R	R	PF	Y	3	10	101 1/2	65 1/2	162	83	37	20	132	4 1/2	67			
7	.....CF-30	3000	24	5722	R	R	PF	Y	3	10	104 1/2	68 1/2	162	83	37	20 1/2	132	4 1/2	68			
8	.....CF-40	4000	15	5738	R	R	PF	Y	3	10	104 1/2	68 1/2	162	83	39	20 1/2	132	4 1/2	68			
9	BF-Shipper-15	1500	18	4385	R	E	PF	Y	5	10	88 1/2	58 1/2	144	68	31 1/2	58	108	5	56				
10	BF-Shipper-20	2000	24	5180	R	E	PF	Y	5	10	87 1/2	61 1/2	144	68	31 1/2	58	108	5	57				
11	BF-15	1500	18	4500	R	E	PF	Y	5	10	88 1/2	58 1/2	168	83	31 1/2	68	132	5	66				
12	BF-20	2000	24	5689	R	E	PF	Y	5	10	107 1/2	71	168	83	29	68	132	5	67				
13	BF-30	3000	24	6388	R	E	PF	Y	5	10	110 1/2	74	168	83	31	68	132	5	69				
14	BF-40	4000	24	7379	R	E	PF	Y	5	10	112 1/2	76	168	83	33	68	132	5	69				
15	BF-40-E	4000	18	7280	R	E	PF	Y	5	10	118 1/2	82 1/2	168	83	35	68	132	5	72				
16	LFS-30	3000	24	8600	R	E	PF	Y	5	10	117 1/2	81 1/2	160	83	42	64	124	4 1/2	80				
17	LFS-40	4000	24	8600	R	E	PF	Y	5	10	118 1/2	82 1/2	160	83	42	64	124	4 1/2	81				
18	LFS-50	5000	24	9330	R	E	PF	Y	5	10	126 1/2	84 1/2	160	83	42	64	124	4 1/2	81				
19	LFS-60	6000	24	10200	R	E	PF	Y	5	10	132 1/2	90 1/2	151	83	45 1/2	61	115	5 1/2	85				
20	LFS-70	7000	24	11200	R	E	PF	Y	5	10	134 1/2	92 1/2	151	83	45 1/2	61	115	5 1/2	85				
21	LFS-80	8000	24	12075	R	E	PF	Y	5	10	135 1/2	93 1/2	148	83	48	59	110	5 1/2	88				
22	LFS-90	9000	24	12400	R	E	PF	Y	5	10	137 1/2	93 1/2	146	83	48	59	110	5 1/2	88				
23	LFS-100	10000	24	13400	R	E	PF	Y	5	10	141 1/2	78 1/2	160	83	38	64	124	4 1/2	77				
24	LF-30	3000	24	7480	R	E	PF	Y	5	10	118 1/2	82 1/2	160	83	42	64	124	4 1/2	80				
25	LF-40	4000	24	8600	R	E	PF	Y	5	10	118 1/2	82 1/2	160	83	42	64	124	4 1/2	80				
26	LF-50	5000	24	9330	R	E	PF	Y	5	10	118 1/2	82 1/2	160	83	42	64	124	4 1/2	80				
27	LF-60	6000	24	10200	R	E	PF	Y	5	10	126 1/2	83 1/2	160	83	42	64	124	4 1/2	81				
28	LF-70	7000	24	11200	R	E	PF	Y	5	10	126 1/2	83 1/2	160	83	42	64	124	4 1/2	81				
29	LF-80	8000	24	12075	R	E	PF	Y	5	10	126 1/2	83 1/2	160	83	42	64	124	4 1/2	81				
30	LF-90	9000	24	12400	R	E	PF	Y	5	10	126 1/2	83 1/2	160	83	42	64	124	4 1/2	81				
31	LF-100	10000	24	13400	R	E	PF	Y	5	10	126 1/2	83 1/2	160	83	42	64	124	4 1/2	81				
32	THFM-10	10000	24	16125	R	E	PF	Y	3	10	153 1/2	111 1/2	134	83	59	60	110	4 1/2	108				
33	THR-12	12000	30	17800	R	E	PF	N	3	10	160 1/2	112 1/2	85	83	52 1/2	49	49	4 1/2	108				
34	THR-14	14000	36	20650	R	E	PF	N	3	10	165 1/2	117 1/2	85	83	56 1/2	49	49	4 1/2	118				
35	THR-15	15000	36	21460	R	E	PF	N	3	10	165 1/2	117 1/2	85	83	56 1/2	49	49	4 1/2	118				
36	THR-16	16000	39	22900	R	E	PF	N	3	10	165 1/2	117 1/2	85	83	56 1/2	49	49	4 1/2	118				
37	THR-18	18000	39	24200	R	E	PF	N	N	N	165	117	85	83	60 1/2	49	49	4 1/2	118				
38	HR-200	20000	42	.....	R	E	Fk	N	N	N	.....	115	100	71	46	61	6	.....	.....		
39	HR-250	25000	45	.....	R	E	Fk	N	N	N	.....	115	100	79	46	61	6	.....	.....		
40	HR-300	30000	48	.....	R	E	Fk	N	N	N	.....	115	100	87	44	59	6	.....	.....		
41	HR-400	40000	48	.....	R	E	Fk	N	N	N	.....	165	150	99	104	6	.....	.....	.....	
42	HR-500	50000	48	.....	R	E	Fk	N	N	N	.....	165	150	103 1/2	92	6	.....	.....	.....	
43	HR-600	60000	48	.....	R	E	Fk	N	N	N	.....	165	150	119 1/2	86	0	.....	.....	.....	
44	HR-800	80000	48	.....	R	E	Fk	N	N	N	.....	165	150	.....	.....	.....	.....	.....	.....
45	PE-427	4000	15-30	.....	RW	E	Pal	N	N	N	60 1/2-80 1/2	30 1/2	.....	30	4	4	1 1/2	.....	.....		
46	PE-627	6000	15-30	.....	RW	E	Pal	N	N	N	60 1/2-90 1/2	30 1/2	.....	30	4	4	1 1/2	.....	.....		
47	TNE-4	4000	.....	.....	RW	E	Ptf	N	N	N	63 1/2-99 1/2	31 1/2	.....	30	3 1/2	3 1/2	2 1/2	.....	.....		
48	TWE-4	4000	.....	.....	RW	E	Ptf	N	N	N	63 1/2-99 1/2	31 1/2	.....	30	3 1/2	3 1/2	2 1/2	.....	.....		
49	TWE-6	6000	.....	.....	RW	E	Ptf	N	N	N	63 1/2-99 1/2	31 1/2	.....	30	3 1/2	3 1/2	2 1/2	.....	.....		
50	TWE-8	8000	.....	.....	RW	E	Ptf	N	N	N	63 1/2-99 1/2	31 1/2	.....	30	3 1/2	3 1/2	2 1/2	.....	.....		
51	TWE-10	10000	.....	.....	RW	E	Ptf	N	N	N	63 1/2-99 1/2	31 1/2	.....	30	3 1/2	3 1/2	2 1/2	.....	.....		
52	TWH-4	4000	15-33	.....	RW	E	Ptf	N	N	N	63 1/2-93 1/2	33 1/2	36	30	21	21	1	63 1/2 w/48 Ptf	53 1/2 w/48 Ptf			
53	SPL	4000	15-33	.....	RW	E	Ptf	N	N	N	63 1/2-93 1/2	33 1/2	83	30	70	70	1	63 1/2 w/48 Ptf	53 1/2 w/48 Ptf			
54	SPH	4000	15-33	.....	RW	E	Ptf	N	N	N	63 1/2-93 1/2	33 1/2	83	30	70	70	2 1/2	63 1/2 w/48 Ptf	53 1/2 w/48 Ptf			
55	SO	4000	15-24	.....	RW	E	PF	N	N	N	67 1/2-85 1/2	37 1/2	102	83	33 1/2-45 1/2	66	66	.....	.....		
56	SS	4000	15-24	.....	RW	E	PF	N	N	N	73 1/2-85 1/2	37 1/2	102	83	48-61	66	66	.....	.....		
57	SCLT	3000	13-24	3735	RW	E	PF	Y	3	18	100 1/2	64 1/2	167	83	34 1/2	67	131	2 1/2	57 1/2				
58	SCLTH	3000	18-24	4215	RW	E	PF	Y	3	18	103 1/2	67 1/2	167	83	36	67	131	2 1/2	60 1/2				
59	CXTA	1000	10-24	2180	RW	E	PF	Y	5	10	85 1/2	49 1/2	160	83	32 1/2	68 1/2	138	2 1/2	43 1/2				
60	CXTB	1200	10-24	2450	RW	E	PF	Y	N	N	85 1/2	49 1/2	160	83	32 1/2	68 1/2	138	2 1/2	43 1/2				
61	CLTA	1000	10-24	2230	RW	E	PF	Y	N	N	85 1/2	49 1/2	160	83	32 1/2	68 1/2	138	2 1/2	43 1/2				
62	CLTB	1200	10-24	2500	RW	E	PF	Y	N	N	85 1/2	49 1/2	160	83	32 1/2	68 1/2	138	2 1/2	43 1/2				
63	ETWE-4	4000	18-36	.....	R	E	Ptf	N	N	N	61 1/2-87 1/2	29 1/2	.....	32	3 1/2	3 1/2	2 1/2	.....	.....		
64	EPE-4	4000	15-30	.....	R	E	Pal	N	N	N	59 1/2-89 1/2	29 1/2	.....	32	4	4	1 1/2	.....	.....		
65	ESST-25	2500	15-24	.....	R	E	PF	Y	N	N	55 1/2-71 1/2	21 1/2	.....	83	40-58	67 1/2	132 1/2	1 1/2	.....			
66	ESST-40	4000	15-24	.....	R	E	PF	Y	N	N	57 1/2-73 1/2	21 1/2	.....	83	40-58	66 1/2	132 1/2	1 1/2	.....			
67	LN-2	4000	.....	.....	R	E	Ptf	N	N	N	112 1/2	57 1/2	.....	39	6	6	5	.....	.....		
68	LN-3	6000	.....	.....	R	E	Ptf	N	N	N	120 1/2	65 1/2	.....	41	6	6	4 1/2	101	61	
69	LO-5	10000	.....	.....	R	E	Ptf	N	N	N	128 1/2	66 1/2	.....	41	5	5	4 1/2	108	66	
70	TLN-2	4000	.....	.....	R	E	Ptf	N	N	N	114 1/2	59 1/2	.....	79 1/2	8	8	4 1/2	97	61	
71	TLN-3	600																					

-Industrial Trucks

Platform and Fork—(Continued)

Lift Type models — pallet, platform and fork — shown on these pages and on Pages 112 and 113 were received too late for publication in their proper alphabetical order. Other specifications are on Pages 26 to 33

PLATFORM OR FORK DIMENSIONS (In.)				ENGINE OR MOTOR		BATTERY		TRANSMISSION		TRUCK SPEED								GRADE-ABILITY (Per Cent)		Dead Man Brake?	Line Number	
Standard Length	Standard Width	Height of Back	Height from Ground When Lowered	Lateral Adjustment of Forks	Make and Model	Horsepower	Normal Voltage	Ampere Hours	No. of Forward Speeds	No. of Reverse Speeds	Unloaded				Capacity Load				Unloaded			Capacity Load
											Forward (mph)	Reverse (mph)	Lifting (fpm)	Lowering (fpm)	Forward (mph)	Reverse (mph)	Lifting (fpm)	Lowering (fpm)				
36	4	36	1	16-28	Auto-Lite	1.5	24		3	3	6.75	6.75	44		5.75	5.75	35		Y	1		
36	4	36	1	16-28	Auto-Lite	1.5	24		3	3	6.5	6.5	44		5.5	5.5	30		Y	2		
36	4	36	2	16-30	Auto-Lite	1.5	24		3	3	4.75	4.75	15		4.25	4.25	12		Y	3		
36	4	30	1 1/2	13-35	ATCO		32		4	4	6.7	6.7	55		6.4	6.4	36		Y	4		
36	4	30	1 1/2	13-35	ATCO		32		4	4	6.7	6.7	55		6.4	6.4	36		Y	5		
36	4	30	1 1/2	13-35	ATCO		32		4	4	6.5	6.5	55		6.3	6.3	33		Y	6		
36	4	30	1 1/2	13-35	ATCO		32		4	4	6.7	6.7	55		6.1	6.1	30		Y	7		
36	4	30	1 1/2	13-35	ATCO		32		4	4	6.7	6.7	55		5.8	5.8	26		Y	8		
36	4	36	1 1/2	13-29	ATCO		24		4	4	5.5	5.5	25		5.0	5.0	20		Y	9		
36	4	36	1 1/2	13-29	ATCO		24		4	4	5.5	5.5	25		5.0	5.0	19		Y	10		
36	4	36	1 1/2	13-29	ATCO		24		4	4	5.5	5.5	25		5.0	5.0	20		Y	11		
36	4	36	1 1/2	13-29	ATCO		32		4	4	6.5	6.5	38		6.0	6.0	30		Y	12		
36	4	36	2	13-29	ATCO		32		4	4	5.0	5.0	38		4.8	4.8	26		Y	13		
36	4	36	2	13-29	ATCO		32		4	4	6.3	6.3	38		5.5	5.5	22		Y	14		
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36	6	36	2	To 38	ATCO		36		4	4	6.4	6.4	31		5.8	5.8	19		Y	18		
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42	7	36	2 1/2	To 38	ATCO		48		4	4	6.1	6.1	29		5.3	5.3	17		Y	21		
42	7	36	2 1/2	To 38	ATCO		48		4	4	5.7	5.7	25		4.9	4.9	15		Y	22		
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36	4	36	1 1/2	To 38	ATCO		30		3	3	5.5	5.5	30		5.0	5.0	18		Y	24		
36	5	36	2	To 38	ATCO		36		3	3	6.5	6.5	32		6.0	6.0	20		Y	25		
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For Abbreviations, see Pages 30 and 31

platform and fork—and 18 manufacturers are represented among the stationary platform and towing tractor types. Your comments on their usefulness will be appreciated. Is there enough data? Representative types? Want more?

... AMA Packaging Show

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Counsel Machine Co.	347, 348, 349



Greater payload shipments of magnet wire is possible with new molded container introduced by Anaconda Wire & Cable Co. Old-style wood containers in the load (white boxes) wasted space, did poor job of protecting materials

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244	United States Steel Co.	874
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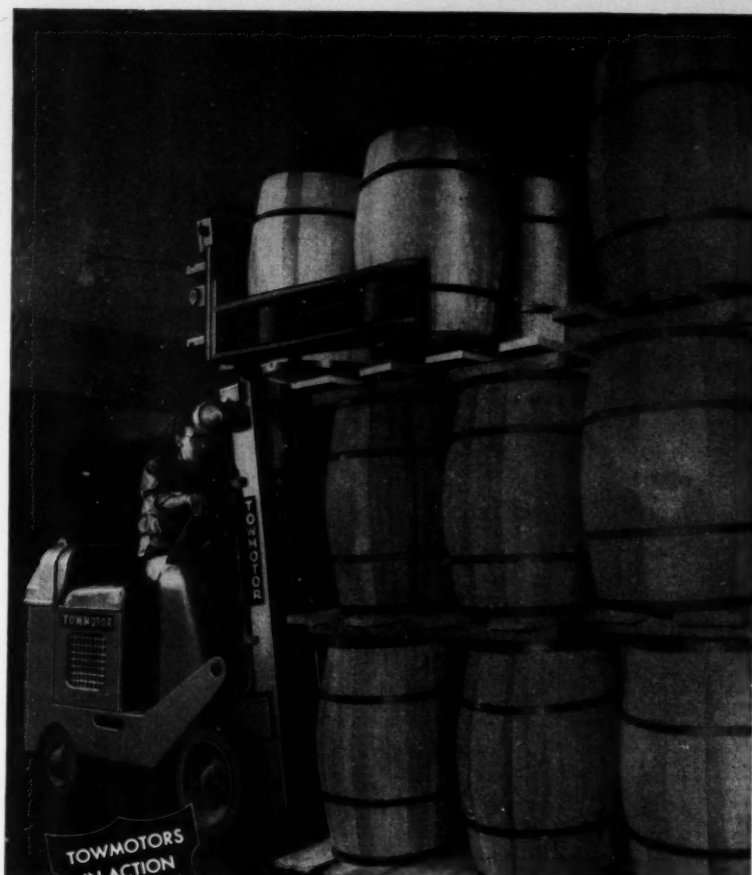
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(Please Turn Page)



New-type hermetically-sealed freight car with a capacity of 100,000 lb is used to deliver bulk cane sugar from Revere Sugar Refinery, Boston, Mass., to D. L. Clark Co., Pittsburgh candy manufacturer. Sugar previously shipped in 100 lb bags was manually unloaded in 18 man hours. Now the sugar only takes 50 min. to unload through three portholes in the bottom of the car



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... AMA Packaging Show

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A 4000-lb capacity fork truck dumps scrap and virgin metals into foundry charging bucket pits. After charging, the bucket is placed on a stand (background) where "orange peel" sections are bound into position. The Electro-Alloys Div., American Brake Shoe, Elyria, Ohio, finds truck offers more flexibility by being kept busy on receiving and shipping handlings when it isn't at charging pits

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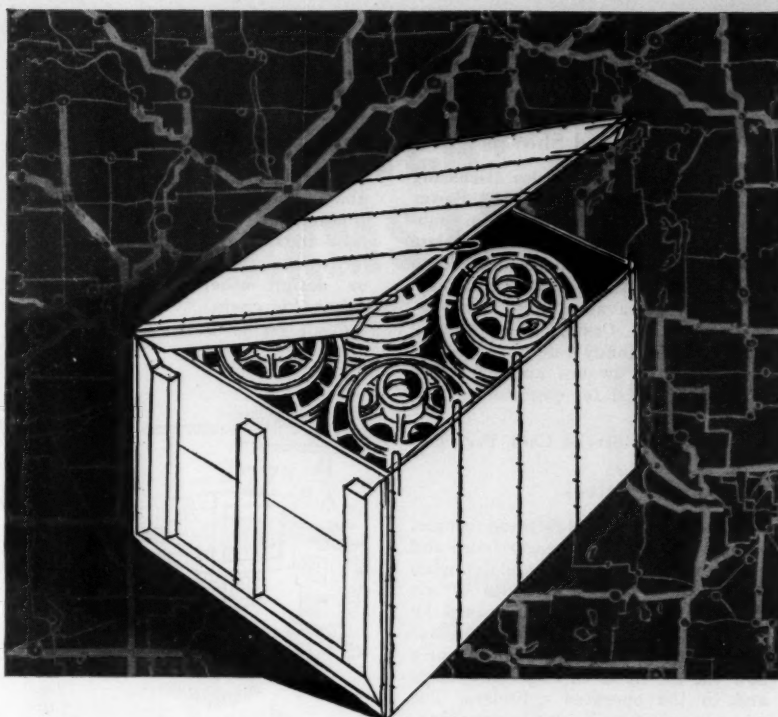


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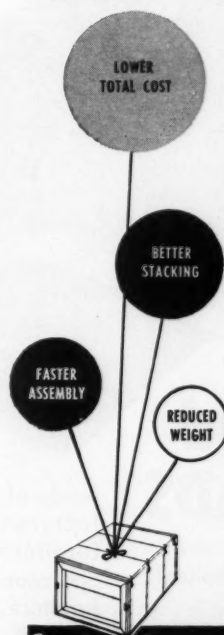
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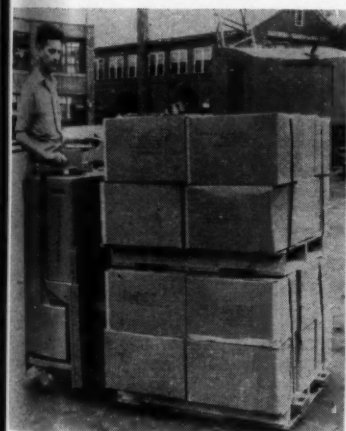
- ☐ Have a sales engineer give me the whole story.
☐ Send me a copy of "What to Expect From Wirebounds".

Name

Firm Name

Address

City, Zone and State



Lewis-Shepard Co. recently announced a new addition to its Master Line of materials handling trucks. It is the Spacemaster Model "M" Low Lift Truck — available in either platform or pallet types. This new riding type electric truck raises 4000-lb loads off the floor and moves at an ideal speed. Because this truck carries both load and operator, higher speeds are possible than with the conventional low lift walkies. One of the outstanding features is its ability to work in minimum aisle space and cramped areas.

Circle No. 22 on Card, Page 35, for more information

Free Literature

(Continued from Page 37)

Power Cranes and Shovels

A series of eight articles discussing the "Use and Application of Power Cranes and Shovels" has been published by Koehring Co. Two complete articles in the booklet are devoted to a discussion of "Safety Considerations with Excavators" and "Excavator Operating Costs," thus making the booklet a handy reference manual for excavator owners and operators as well as a text for engineering students.

Circle 342 on Service Card, Page 35

Air Control Valves

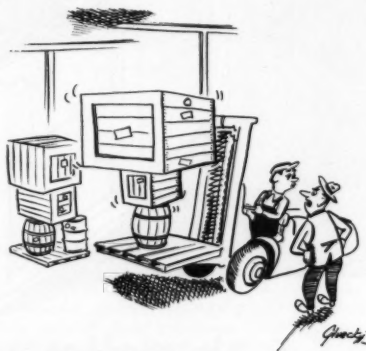
A new 12-page illustrated booklet which explains the characteristics and advantages of air power and describes the three fundamental types of air control valves has been released by the Roos Operating Valve Co. Color diagrammatic drawings show clearly how the air flows through the valves and to the operated cylinders. The advantages of each type, an explanation of how they work, and a list of available standard models are included.

Circle 343 on Service Card, Page 35

Detachable Chain

A new bulletin on Rex Steel Detachable Chain has been published by Chain Belt Co. of Milwaukee. The book should be of interest to all who buy or maintain steel detachable chain or design other type applications using this chain.

Circle 344 on Service Card, Page 35



"Where did you say you got your experience?"

Plant Layout

The third in a series of booklets designed for administrating and operating executives of industry, "Plant Layout" is available from the consulting engineering firm of Wheeler Associates Inc. The booklet includes a check of two dozen questions designed to aid in evaluating your company's existing layout.

Circle 345 on Service Card, Page 35

Mileage Economy Run

W. S. Mount, of Socony-Vacuum Oil Co. spoke before the annual meeting of SAE on "The Economy Run—Par for Gasoline Mileage." His address covers the history of the famous automobile mileage road competition with statistics, diagrams and graphs and AAA regulations for the run.

Circle 346 on Service Card, Page 35

Protective Coatings

Pittsburgh Coke & Chemical Co. has prepared a series of five bulletins describing the firm's series of tar base protective coatings. Bulletin 100 gives specifications, uses and methods of applying all four coatings in the series and 101, 102, 103 and 104 describe the coatings in detail.

Circle 347 on Service Card, Page 35



FULCO

NEW

Diamond Stitched FURNITURE PADS

Lock-stitch (non-raveling) Seams—sewed with extra strong thread. Absolutely cannot ravel.

Diamond Cross-Stitch Quilting—No shifting or lumping . . . the generous padding stays uniform throughout the long life of the pad.

Fulton BAG & COTTON MILLS

Atlanta • New Orleans • Dallas • St. Louis • Denver • Los Angeles
Kansas City, Kans • Minneapolis • New York City, 347 Madison Ave. • Winter Haven, Fla. • San Francisco • Phoenix

Write for illustrated Fulco pamphlet giving sizes and prices of other style pads and van accessories.

Made of soft, abrasion resistant fabric, manufactured in our own mills, exclusively for furniture pads. Two tone fabric reminds operator to use "clean side" of pad next to furniture. Gold webbing binding adds extra strength. We guarantee Fulco Pads to give complete satisfaction or money refunded. Quick service from your nearest Fulton branch . . . price list on request.

New Fastener Catalog

The first complete catalog issued by Simmons Fastener Corp. in several years contains 36-pages of their expanded line of fasteners. It introduces their new Dual-Lock, a high load fastener that is adaptable to panel fastening for military shelters, large demountable shipping containers and aircraft cowlings, as well as to all butt-joint fastening.

Circle 348 on Service Card, Page 35

Purifier Protection for Pipes

To help engineers, production executives and maintenance personnel who are becoming increasingly conscious of using purifiers to clean up moisture, mist, dirt, particles, gunk and other entrainment in pipelines and equipment, the V. D. Anderson Co. has published a new 8-page folder entitled "End Dirt and Moisture Problems the Hi-eF Way."

Circle 349 on Service Card, Page 35

Practical Metallizing

Metallizing Engineering Co., Inc. has published an 8-page illustrated bulletin describing the characteristics of sprayed metal, where metallizing is used, its general advantages and limitations, with additional information on the savings in time and money effected on various typical metallizing jobs.

Circle 350 on Service Card, Page 35

VPI Skid Research

Virginia Polytechnic Institute Wood Research Laboratory has just completed research on the strength of Auto-Nailer assembled skids for the Auto-Nailer Co.. This 16-page report, which graphically illustrates torsional and edge-wise compressive resistance of various size skids, will interest all wood users.

Circle 351 on Service Card, Page 35

Protective Taping

A new illustrated brochure designed to help solve corrosion problems has been released by the Tapecoat Co. It presents practical suggestions to combat corrosion and details on how and where coal tar protection can be used to best advantage.

Circle 352 on Service Card, Page 35

High Temperature Lubrication

How 'dag' colloidal graphite has been used successfully to lubricate kiln cars at 450 deg F, oven conveyors up to 1200 deg F, and forging dies at over 2000 deg F, is described in a new, illustrated bulletin issued by Acheson Colloids Company.

Circle 353 on Service Card, Page 35

(Resume Reading on Page 38)

All the **POWER** *you want*
In an **ARMS LENGTH**



Only
27 3/4 Inches
Longer
than the
Load

MODEL PAL



Think of it . . . in only 27" is packed the complete power unit for the "Walkie" type lift truck. *Other models are only 23 3/4" . . . That's space efficiency . . . plus!

If you have a material handling problem that requires minimum "operation area", ask about the "Walkie" MOTO-TRUC. Its application in close areas is making history every day . . . write for complete information on all the advantages of MOTO-TRUC.

Representatives in Principal Cities

The **MOTO-TRUC Co**

1956 E. 59th STREET • CLEVELAND 3, OHIO
PALLET . . . PLATFORM . . . HI-LIFT TRUCKS
LARGEST EXCLUSIVE MANUFACTURER OF "WALKIES"



Circle No. 20 on Card, Page 35, for more information

DISTRIBUTION DILEMMAS...



and
how
to
solve
them!

If you think the divided responsibility that comes from dealing with many separate warehouse companies is strictly for the birds, you'll really go for our big "one company" distribution package. It includes pool car distribution, local cartage, warehousing and storage, packing and crating in 53 important Western cities and towns—plus unexcelled motor freight service to 900 key points from the Great Lakes to the Pacific Coast.

Call your nearest Consolidated agency or write to the address below for "Your Key"—our new list of services and where they're available.



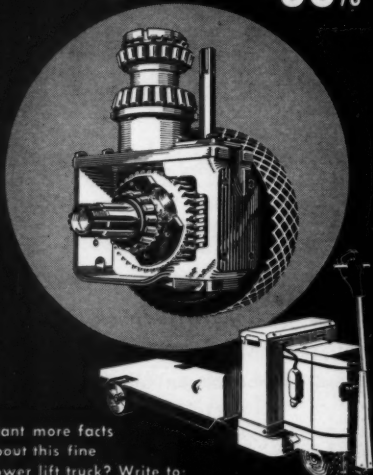
CONSOLIDATED FREIGHTWAYS

GENERAL OFFICES: PORTLAND 8, OREGON

STUEBING DESIGNED • STUEBING ENGINEERED • STUEBING BUILT

Hydroelectric LIFT TRUCKS

give you 50% easier steering



Want more facts about this fine power lift truck? Write to:



LIFT TRUCKS

INCORPORATED

There is a model for every purpose to handle any kind of material.

The twin front wheel drive of a HYDROELECTRIC allows the operator to make shorter turns in closer quarters with one-half the effort of conventional single drive wheels. This is much more important than having a short truck.

The extreme ease of steering is obtained by the true automotive type of sealed-alloy gear transmission with opposed Timken bearings in steering column and wheels for true alignment. No troublesome chain drives... long life... less maintenance. Heat treated worm gears transmit power smoothly... are trouble-free for years. All gears including differential are sealed in lubricant. The entire power unit is interchangeable on all series "K" models.

2423-31 SPRING GROVE AVE.
CINCINNATI 14, OHIO

Industry Items

Trans World Airlines will inaugurate direct flights from New York to Colombo, Ceylon.

Railway Express Agency has instituted a six-week training program for the training of recently appointed supervisors of service.

Gramm Trailer Corp., Lima, Ohio, has leased its Forest, Ohio, plant to the A.A.A. Tank Company for manufacture of tank bodies and tank trailers for liquid hauling. Gramm will merchandise the Forest product.

L. Norris Hall, Inc., Philadelphia, Pa., steel warehouse concern, has awarded a contract for the first steel warehouse for direct distribution of low-carbon steel products in the Wilmington-Chester-South Jersey area to Luria Engineering Company, Bethlehem, Pa. The warehouse will be located in Wilmington, Del.

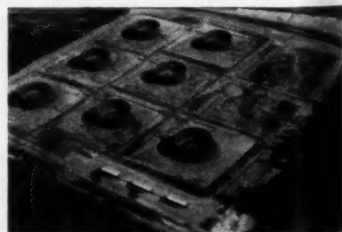
Colorado Fuel & Iron Corp. has completed the acquisition of the plants, inventories and business of John A. Roebing's Sons Co., Trenton, N. J. The Roebing properties will be operated by John A. Roebing's Sons Corp., a newly-formed and wholly-owned subsidiary of Colorado Fuel & Iron.

Emery Air Freight Corp. is expanding its 27 branch offices into four major regions, Eastern Central, Midwest and Western, and subdivided into districts headed by a district manager.

National Container Corp. has purchased Empire Box, Inc., Atlanta, Ga. The company will continue manufacturing operations of the fully-integrated box plant under the name of National Container Corp.

Rock Island Lines received delivery of the first of 200 covered hopper cars which will be used primarily for the transport of bulk cement.

Engineering aspects of fork lift truck design and manufacturer was described in a recent lecture at Georgia Institute of Technology, Atlanta, Ga. by B. I. Ulinski, director of engineering of the Automatic Transportation Co., Chicago, Ill.



Air Material Command has formally accepted this \$2,341,000 petroleum bulk storage facility at North Charleston, S. C. and placed it in operation. Capacity is 23½ million gal

Luria Engineering Co. is erecting a 12,000 sq ft warehouse for the Wilmington Paper & Twine Co., Wilmington, Del.

The Industrial Division of Gould-National Batteries Inc. is soon to start production in a new \$3,000,000 factory at Kankakee, Ill. This plant, the company's 21st in the United States and Canada, adds nearly five acres of floor space to the company's productive capacity.

The Port of Stockton, Stockton, Cal., celebrated its 20th anniversary Feb. 3 with an open house and a huge industrial, commercial and agricultural exposition.

United Air Lines declared the regular quarterly dividend of 25¢ per share on the company's common stock payable March 16.

American Car & Foundry Co. has received an order from the Gulf, Mobile and Ohio Railroad for 400 50-ton, high side gondola cars with fixed ends.

Pacific Intermountain Express Co. announces it will operate a new terminal in Las Vegas, Nev. to be built by its subsidiary, Intermountain Terminal Co.

Esso Standard Oil Co. is constructing a new dock for unloading petroleum product barges at Boomer, W. Va., near Charleston. It will be the fourth river dock constructed for Esso by Dravo Corporation in the past few years.

Farmers Engineering & Manufacturing Co. opened a new plant at Irwin, Pa., valued in excess of one million dollars.

Manufacturers National Distribution Center is being built on a 54 acre tract near the Harrisburg East Interchange of the Pennsylvania Turnpike. The Terminal, capable of handling 150 trucks at one time, will expedite merchandise delivery for some 30 to 40 truck lines operating through Harrisburg directly to 28 states.

Hercules Motors Corp., Canton, Ohio, has opened new sales and service facilities in Oklahoma City, Okla.



Bekins Van and Storage Co. newest furniture warehouse in Santa Ana, Cal. The structure comprises 37,500 sq ft of storage space for household furnishings, office files and other office equipment

Hapman Conveyors, Inc., Kalamazoo, Mich., has appointed Davis Material Handling Co., Los Angeles, as its Southern California dealer.

Pacific Intermountain Express has established off-line sales offices in Milwaukee, Cincinnati and Cleveland. Other offices are also maintained in New York and Washington.

National Container Corp., New York, N. Y., has opened a new sales office in Atlanta, Ga., to insure better sales service for shippers and manufacturers in the Ga., Ala., and Southwest Tenn. area.

GMC Truck & Coach Division, General Motors Corp., Pontiac, Mich., honored 277 employees with 25 or more consecutive years' service with gold watches and testimonial banquet.

The Rapids-Standard Co., Inc., Grand Rapids, Mich., moved to larger quarters at 144 Trowbridge St. N. W. The Sales Engineering Dept. was shifted to another company plant at 507 Plymouth Rd.

Cleveland Tramrail Toledo Co., Toledo, Ohio, has been appointed exclusive dealers in Hyster industrial truck equipment.

Michigan Materials Handling Corp., has been named Michigan distributor of Beacon Power-Operated Dock Ramps.

Brown Equipment & Mfg. Co. is to be named distributor for Fruehauf equipment at Springfield, Mass.; Baltimore, Md., and Charlotte, N. C.



40 fine drawings showing construction detail and optional features

68 individual van illustrations, current types and styles.

Ask us to send you this new helpful VAN PLAN GUIDE

Our new catalog of van styles and construction features gives you a new look at Gerstenslager Custom-built Bodies. Illustrations include cutaway views of Gerstenslager construction detail, variations in tailgate, rear doors, and wheelhousings, as well as other equipment. You will find an interesting display of typical vans showing the varied styles favored by owners of Gerstenslager vehicles. This is a valuable book to have in your files to help you decide on details of your next van. Address Dept. D.

THE GERSTENSLAGER CO., WOOSTER, OHIO

Phone Wooster 120

Cable address GERSTCO

Established 1860



GERSTENSLAGER

VANS • TRUCK BODIES • SPECIALTY BODIES
From Wooster to the World of Transportation

Circle No. 25 on Card, Page 35, for more information

Men in the News

(Continued from Page 13)

Packages & Packaging

O. D. Lloyd—new sales manager, Louisville Corrugated Div., General Box Co.

R. F. Miles—president, Rathbone Hair & Ridgway Box Co., elected president of the National Wooden Box Association.

Barth Gilerist named division manager at Phila. for the Gustin-Bacon Mfg. Co., Kansas City, Mo. He was formerly sales and service engineer attached to the Eastern Division.



Robert N. Conners—vice president and general sales manager, Chase Bag Co., Chicago, Ill., has been appointed to the Advisory Committee of the Executive Research Council.

Carl E. Schmitz has been appointed vice-president in charge of sales for Crane Packing Co.

Traffic

James E. Weaver—appointed assistant traffic manager of Columbia-Southern Chemical Corp.

Richard H. Welchans—formerly assistant traffic manager of Arcady Farms Milling Co. has been promoted to traffic manager to succeed the late Howard N. Sullivan.

Howard McGalin—formerly traffic manager for Mathieson Chemical Co. at Houston, Tex. has been promoted

Ross W. Bennington—new general traffic manager, United States Rubber Co.

Edward T. Duffy—appointed distribution manager, Swan-Finch Oil Co., New York, N. Y.



Harvey G. Hansen has been appointed vice-president, The Mennel Milling Co. He has been in the company's traffic department since 1925 and its manager since 1927.

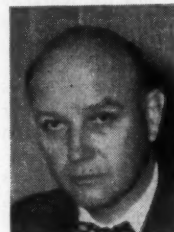
Highway

Arthur W. Lang—named Dayton, Ohio, branch manager, Trailmobile, Inc.

Leslie E. Baker—new Toledo, Ohio, branch manager, Fruehauf Trailer Co.

J. A. Kiggen, Jr.—new export manager, White Motor Co. E. H. Gustafson—named Chicago branch manager by White.

Perrie E. Bruse—now Salt Lake City, Utah, district manager, Pacific Intermountain Express.



H. Conrad Lueck has been placed in charge of investigating and loss prevention activities of the Cargo Protection Bureau of Babaco Alarm Systems, Inc.

Bob Couture—new terminal manager, Consolidated Freightways, Rice Lake, Wisconsin; Joe Hunt—appointed district sales manager, Los Angeles, Cal., Frank Nelson—promoted to new position of Redmond sales representative.

William C. Avery—appointed field engineer for the Hunter Manufacturing Co., Cleveland, Ohio. He will establish headquarters in San Francisco, Cal.



a Bigger, Better WISCONSIN

HEAVY-DUTY Air-Cooled ENGINE

The NEW Model VG4D 25 to 36 H.P.

MORE
Power
TO FIT THE
JOB

MORE
Power
TO FIT THE
MACHINE

16% More Power For Your Equipment

Complete Power Unit with Clutch Reduction.

Another engineering achievement . . . the NEW Model VG4D V-type 4-cylinder Wisconsin Heavy-Duty Air-Cooled Engine, increasing the power range to 36 hp. — a power gain of more than 16% over the VP4D, former top engine in the line.

The NEW Model VG4D is an exceptionally smooth-running, even-firing engine. Its light weight and compactness in design simplify the problem of engine installation on modern equipment where weight and space limitations are important factors.

Every one of the traditional Wisconsin 4-cylinder features are built into this new model. These include, to name a few, tapered roller main bearings, dynamically balanced forged crankshaft, mirror finish on crank pins, Stellite-faced exhaust valves and valve seat inserts and honed cylinders for long, dependable, heavy-duty engine life.

The Model VG4D engine is definitely Tops in Performance, delivering a maximum of power per pound of engine weight, at minimum operating and maintenance costs.

We invite your request for complete detailed specifications.



WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

Circle No. 26 on Card, Page 35, for more information

CUT MARKING TIME with LISTO

The Marking Pencil that Writes on Everything!

WRITES ON GLASS!

WRITES ON METAL!

WRITES ON PLASTIC!

Thousands of manufacturers, shippers and freight companies call Listo "America's No. 1 marking system." And no wonder! Listo is fast, writes on everything, and is inexpensive. Try a Listo today for the answer to your marking problems!

EXTRA HEAVY LEADS

That don't fall out or break

6 COLORS

RED GREEN BROWN
BLUE YELLOW BLACK

AT RETAILERS EVERYWHERE



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LISTO PENCIL CORP., ALAMEDA, CALIFORNIA
In Canada: LISTO PRODUCTS, LTD., VANCOUVER, B. C.

Circle 34 on Readers' Service Card

Charles T. Villa—president, C. T. Villa Carting Co., elected president, Independent Movers & Truckers Assoc., Buffalo, N. Y.

Robert Cass—White Motor Co., installed as president, Society of Automotive Engineers.

Rail

James F. Holst—named general land and tax commissioner, Union Pacific Railroad.

Water

W. N. Blanton—appointed to the Houston, Texas, Port Commission.

Charles L. Hansen—Socony-Vacuum Oil Co., decorated with the Knight Cross First Class of the Order of the Dannebrog, ancient Danish Order of Knighthood.

Thomas S. Lynch—new traffic manager, James Hughes, Inc., New York, N. Y.

Warehousing



T. R. Handel—named general superintendent of operations by the Cleveland Cartage Co. He has been with Cleveland for the past 25 years.

A. A. Friedel—Lincoln Storage Co., named president, Cleveland Furniture Warehousemen's Assoc.

Carl E. Smith—new president and general manager, Central Detroit Warehouse Co. Charles E. Peltz—named vice president of operations, and Douglas J. Fuller, secretary and treasurer.

William E. Goldsmith—appointed Central Illinois district manager, Great American Transport, Inc.

Sam B. Stocking, Jr.—elected president, Pacific Storage & Distributing Co.

Phillip B. Jameson—elected president, Atlantic States Warehouse & Cold Storage Corp.

—DA—

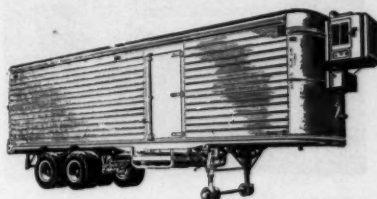
OBITUARIES

Edward M. Seay, 53, assistant to the vice president of American Air Lines, died Feb. 25 at his home in New York, N. Y., after a long illness. He served in both World Wars. In the second he was in the public relations office at the Naval Depot, Washington, with the rank of lieutenant commander.

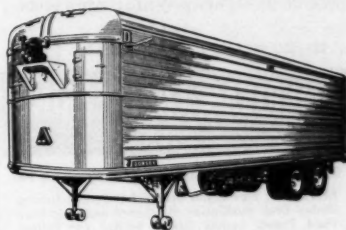
Malcolm Zimmerman, of the New Haven Cold Storage & Warehouse Co., New Haven, Conn., died recently at the age of 44. Active for many years with the NARW, Mr. Zimmerman died of a heart condition aggravated by a severe cold.

William C. Mack, one of the three brothers who originated the Mack Truck, died in February at his home in Huguenot Park, Staten Island, N. Y. He was 94. Mr. Mack and his brothers switched from carriage building to building Mack trucks in 1903.

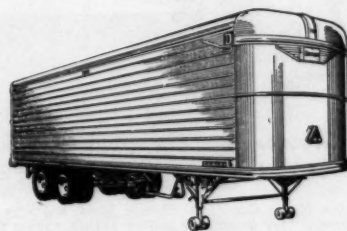
Toughest of EXTRA LIGHT Trailers



DURABLE



DEPENDABLE



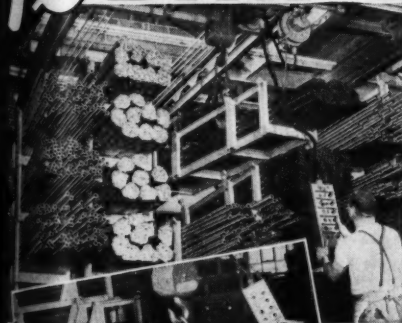
with the Dorsey trouble-free
Tandem that requires
NO LUBRICATION

DORSEY TRAILERS

ELBA, ALABAMA

Circle 35 on Readers' Service Card

PS Portable HEAVY DUTY BAR RACKS

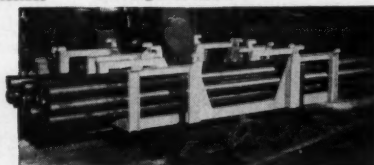


for quick
convenient
safe
efficient
storage

Item No.
C-497

Handling and storage of steel shapes simplified for one-man operation. Using overhead crane for storage in tiers, rack selection is no problem. Design permits bar selection from any rack without disturbing tiers. Built to any capacity and length of stock.

Any rack
easily
accessible



Easily placed on trucks for removal to machines not under crane.

Automatic Tong by HEPPENSTALL, Pittsburgh, Pa., for easy pick-up and safe carrying.

DESIGNED AND MANUFACTURED BY

Palmer Shile Co.

16054 FULLERTON AVE., DETROIT 27, MICH.

When Ordering Always
give "item" number; this
will help prevent error.
Write for catalog.

Circle No. 27 on Card, Page 35, for more information

Circle 36 on Readers' Service Card
SPEED?...SAFETY?...SAVINGS?
 THEY'RE YOURS WITH A

LO-HED CAR PULLER



With a Lo-Hed Car Puller at your siding, cars will be loaded and unloaded a lot faster. You'll also eliminate a cause of accidents, cut demurrage costs and abolish shifting charges... Lo-Hed Car Puller saves money inside a plant, too. Rugged, electrically-driven, it pulls anything within its capacity. Write for full facts.

LO-HED MEANS LOW OVERHEAD



AMERICAN ENGINEERING
 COMPANY

2524 Aramingo Avenue • Philadelphia 25, Pa.

AE Products are: Taylor and Perfect Spread Stokers, Marine Deck Auxiliaries, Hydramite and Hale-Shaw Fluid Power, Lo-Hed Hoists, Lo-Hed Car Pullers.

NOLAN ONE-MAN CAR DOOR OPENER

Opens
Doors
in
20
Seconds
or less!



the Nolan Car Door Opener gives one man a tremendous amount of pulling energy, to get the most stubborn, hard-rolling door wide open in a hurry!

No gangs needed. No mangled limbs or loss of life. A few quick pulls on anchor chain gets any door open in a jiffy. The NOLAN saves its low initial cost in first hour of operation. New safety and efficiency features now make the Nolan One-Man Car Door Opener a more necessary labor-saving money-saving help than ever before.



Free
Literature
Order
one or
more
NOLAN
Model-H
Car Door
Openers
now

Many Thousands
in constant
daily use!

\$29⁵⁰

F.O.B.
BOWERSTON

The NOLAN COMPANY
 108-C Pennsylvania Street
 Bowerston, Ohio

Circle 37 on Readers' Service Card

Chuting the News

(Continued from Page 13)

Hyster Opens European Plant

Opening of a new plant in Europe for the manufacture of materials handling equipment has been announced by Eugene Caldwell, vice-president and general manager of Hyster Co. The new firm, Hyster Europe, N.V., has been incorporated in Holland, and will build certain Hyster products for the European market. The Hyster operation will occupy a new plant at Nijmegen, Holland, some 10 miles from the German border, about June 1, 1953.

—DA—

Trucking Group Meets

The ATA's councils on safety, equipment and maintenance, and terminal operations will meet May 11 to begin four days of technical discussions at the Adolphus Hotel, Dallas, Tex.

—DA—

The Milwaukee Traffic Club, in cooperation with the University of Wisconsin, Milwaukee Extension Division, evening school, has awarded eight one-year scholarships in Introductory, Intermediate and Advanced Traffic Management and Transportation Law.

—DA—

Trucking Commission

America's trucking industry and the AF of L teamsters last month took another step in their plea to strip the ICC of authority over the trucking industry. As a follow up to the January meeting with President Eisenhower, the group met with Defense Mobilization officers in the White House to demand the immediate creation of a Federal Motor Transport Commission.

—DA—

PIE has announced formation of a new department charged with the sole responsibility of handling equipment exchange involved in interline operations.

Joint Meeting

Some 160 members and guests attended a joint meeting last month of the Philadelphia chapters of the American Materials Handling Society and the Society of Industrial Packaging and Materials Handling Engineers.

James H. Crawford was the principal speaker, outlining the handling scheme at the recently completed one-story warehouse of the Frankford Grocery Co. (DISTRIBUTION AGE, October, 1952). Crawford's description of Frankford's incentive bonus schedule and the single story-fork truck operation evoked considerable interest.

—DA—

B. J. Guarino was elected president of the Traffic Club of Brooklyn at its recent Annual Meeting.

—DA—

Traffic Dinner Dates

April

- 11 Women's Traffic Club of Tulsa, Okla.
- 14 New Haven (Conn.) Women's Traffic Club
- 14 Seattle Industrial Traffic Managers Assn.
- 16 Transportation Club of Freeport, Ill.
- 16 Kanawha Valley Transportation Club, Charleston, W. Va.
- 16 Traffic Men's Assn. of Cedar Rapids, Ia.
- 18 The Transportation Club of San Francisco
- 21 The Capital District Traffic Assn., Albany, N. Y.
- 22 Transportation Club of Springfield, Ill.
- 23 Columbus (Ohio) Transportation Club
- 23 Metropolitan Traffic Assn. of New York
- 27 Manufacturers Assn. Traffic Club of Lancaster, Pa.
- 30 Fort Wayne (Ind.) Transportation Club

May

- 13 Bridgeport (Conn.) Women's Traffic Club
- 13 Danbury (Conn.) Shippers & Carriers Assn.
- 13 Traffic Club of Lake Charles, La.
- 13 Wyoming Valley Traffic Club, Williamsport, Pa.
- 14 Cincinnati Women's Traffic Club
- 14 Women's Traffic and Transportation Club of Portland, Ore.
- 15 Traffic Club of Akron, O.
- 18 Women's Traffic Club of Houston, Tex.
- 20 Women's Traffic Club of Lackawanna Valley, Scranton, Pa.
- 20 Traffic Club of Billings, Mont.
- 25 Women's Traffic Club of Fort Worth, Tex.
- 25 Transportation Club of Milwaukee, Wis.
- 26 Women's Traffic Club of Los Angeles, Calif.

ATA Names Committee On Legislative Policy

C. J. Williams, president of Hillside Transit Co., Milwaukee, Wisc., was appointed chairman of the American Trucking Association's Conference Legislative Program Committee.

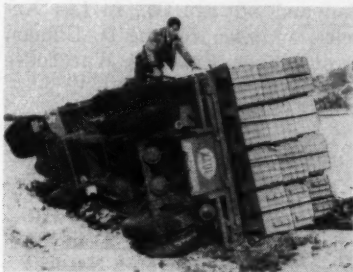
Formation of the committee grew out of recommendation by the Contract Carriers Conference, which was advised by a Congressional spokesman that the trucking industry should display reasonable unity in its representations to legislative groups.

—DA—

Proposals to require compulsory periodic inspection of the mechanical safety of motor vehicles and required equipment, or to amend existing laws, have been introduced in 12 states, according to NHUC. At the same time, NHUC reports, 25 states are considering memorials to Congress to repeal the Federal Tax on motor fuel.

OPS Record Disposal

On the heels of the OPS decontrol announcement concerning warehouses came a reminder that premature disposal of OPS records should be avoided. Warehousemen need not maintain records concerning price transactions made after Feb. 18. However, records on transactions prior to that date must be kept available for inspection until April 30, 1955.



Strapping a load of refractory brick to pallets on a truck-trailer, saved the Kaul Clay Products Co. about \$500 when the truck overturned. Even though the force of impact twisted the coupling 90 deg., the 26,000-lb load was held securely in place by Acme Steel Unit-Load Band

Annual Road Awards

Annual awards to highway departments preparing the best yearly reports to the public on the status of road systems under their jurisdiction will be presented this year by the National Highway Users Conference.

—DA—

The first of a series of one-day conferences between officials of the Cargo Traffic Division, New York Port of Embarkation, and motor carriers serving the Port was conducted the last week in February at the Brooklyn Army Base.

—DA—

PIE's New Terminal

Pacific Intermountain Express late in February opened the doors of its new 5.8-acre, \$620,000 terminal in Kansas City, Mo. The new terminal, second largest in the PIE system, has a freight dock capable of handling 48 line-haul and pick-up and delivery units simultaneously.



Ametron

ELECTRONIC CRANE SCALE

for heavy industrial weighing and remote recording

REDUCES INSTALLATION COSTS! Entire assembly ready to attach to crane or hoist. Only a cable connection is run from Baldwin Load Cell to remote recorder.

REDUCES OPERATING COSTS! Great savings in time and man power are possible because weighing and transporting operations are combined. Scale is easily removed from crane whenever desired.

REDUCES MAINTENANCE COSTS! The only element subjected to weight is the sturdy load cell, which can be easily replaced or interchanged.

See Ametron in Action at Booth 1843 Material Handling Show



THE STANDARD OF ACCURACY SINCE 1888
STREETER-AMET COMPANY
 4101 N. RAVENSWOOD AVENUE • CHICAGO 13, ILLINOIS
 BRANCHES IN PITTSBURGH, PA. and BIRMINGHAM, ALA.

Circle No. 28 on Card, Page 35, for more information

METZGAR GRAVITY CONVEYORS

Life-time Construction

Means More for Your MONEY



Standard Sections
 Wheel-Roller
 Widths
 11 1/2"; 15"; 18"
 Lengths
 8'; 10'
 Curves
 45° - 90°

16 YEAR'S Continuous Service

... at no maintenance cost because Metzgar carries the load on these sturdy bearings — 1/4" steel balls (Hoover or equal) spinning in hardened labyrinth ball races.

Standard in all Metzgar wheel and roller gravity Conveyors.

Write for descriptive folder.

METZGAR CO.

MGFRS. OF WHEEL & ROLLER GRAVITY & LIVE ROLLER CONVEYORS • POWER BELT CONVEYORS • SWITCHES • ACCESSORIES & REEL DOLLIES



422 Douglas, N.W.

GRAND RAPIDS 4, MICH.

Circle No. 29 on Card, Page 35, for more information



FINGERTIP CONTROL

Revolvator Co-Getter — telescopic straddle type lift truck — a bear for work in crowded areas, narrow aisles. Fully automatic — extraordinarily maneuverable 200° turning arc — 2500 lb. capacity — very slight operator training necessary. Write for full details of this and many other models.

See us at Materials Handling Exposition, Booth 724.

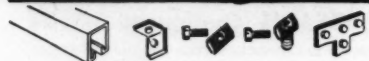
REVOLVATOR CO.

8796 TONNELE AVENUE • NORTH BERGEN, N. J.



ALL-STEEL ADJUSTABLE

FRAMING



FOR EVERY STORAGE OR RACKING REQUIREMENT

Versatile, easy-to-install, expandable and 100% re-usable, the FLEXA System can be used for every presently required storage or handling need... grows economically with every changing requirement. Better investigate FLEXA today... write for free Catalog 153 and full information. No obligation.



FLEXA STEEL PRODUCTS, INC.
9501 West Washington Blvd., Chicago 7, Illinois
SEE US! BOOTH 509-511
MATERIALS HANDLING SHOW

Circle 39 on Readers' Service Card

Chuting the NEWS

(Continued from preceding page)

National Furniture Warehousemen's Association Names Hathaway President at Annual Meeting

Austin H. Hathaway, of Los Angeles, Cal., was elected president of the National Furniture Warehousemen's Association at the Annual Meeting in Boca Raton, Fla.

Hathaway, vice president of Lyon Van and Storage Co., in Los Angeles, succeeds Jerome D. Ullman, president of Federal Warehouse Co., Inc., Peoria, Ill.

—DA—

The annual meeting of the Virginia Movers and Warehousemen's Association will be conducted May 22-23 in the Natural Bridge Hotel, Natural Bridge, Va.

—DA—

MHI Discusses Program For User Workshops

Additional plans for the proposed MHI user workshops, to be presented by the Institute at local chapter meetings of the AMHS, were discussed at the meeting in Chicago, Mar. 18.

It is tentatively planned that five representatives from each of the product section groups will participate in each of these special sessions.

The 13 product sections were grouped as follows: Gas trucks, electric trucks, powerized hand trucks and electrical accessories; floor trucks, hand lift trucks and wheels and casters; steel strapping, containers and auxiliary equipment and pallets; monorail and electric hoists; conveyors.

The afternoon sessions were devoted to an address by Saul Poliak, of Clapp and Poliak, and to committee reports by the College-Industry, Industry Educational and Industry Workshop committees.

—DA—

Announcement has been made of a new award to Branch Motor Express Co. for outstanding claim prevention performance in 1952. This is the third year running Branch has won the Liberty Mutual Insurance Co. plaque.

Other officers elected include: George Winkler, Jr., J. C. Aspinwall, Jr., Daniel P. Bryant and William J. Croul, vice presidents; Joseph A. Hollander, secretary; and George A. Julin, treasurer.

The Board of Directors includes: William C. Boyce, V. A. Carroll, Harold L. Fates, A. A. Friedel, and W. Ray James.

—DA—

Southeast Traffic Club Formed in Los Angeles

Announcement has been made of the formation of the Southeast Traffic Club of Los Angeles. The club has an initial enrollment of 140. Officers are: Ralph S. Schmitt, president; Howard A. Leatart, first vice president; Peter Kazarian, second vice president; Arthur A. Miller, secretary, and Ray V. Parada, treasurer.

Directors include: John W. Cummings, Mike A. DeLorenzo, Harold F. Gulde, Frank Krantz, Kenneth E. McClune, Edwin C. VanNess, Philip A. Russell, Adolph H. Hanson, Clair F. Coe, Waldorf D. Burk, D. C. Wilkens and Bryan J. Conrey.

—DA—

Merger Studied

A report out of Washington late last month noted that two of the nation's largest air freight lines, Flying Tiger Line and Slick Airways, are considering a merger. The report has been confirmed by both company presidents. The merger is awaiting approval by the CAB and company stockholders.

—DA—

It has been called to our attention that the original list of new MHI directors, as released by the Institute December 18, was incomplete. The name of J. W. Wunsch, of Silent Hoist & Crane Co., has been added as a director representing the Gas Truck Product section.

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Conveyor Safety

Jervis C. Webb, of the Conveyor Equipment Mfg. Assoc., recently outlined the following 10 steps to insure safe operation of conveyor systems.

1. Never put a conveyor system into operation until it has formally been turned over by the manufacturer.
2. Be sure drive machinery is guarded.
3. Keep lubrication piped to safe points.
4. Provide adequate clearances for maximum loads.
5. Consider visibility in locating controls and in loading.
6. Confine operation of conveyors to authorized employees.
7. Leave repair to maintenance employees.
8. Provide a smooth cover under slat conveyors to avoid shearing.
9. Insist on no riding and no stepping on conveyors.
10. Instruct employees in loading—to consider clearances, visibility, protruding hazards and danger of tumbling.

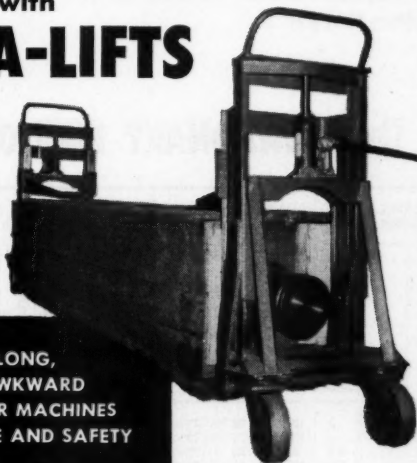
A Wealth of Information . . .

For additional data on Products and Literature described in this issue—use the Reader Service Card

. . . See Page 35

MOVE the IMMOVABLE with ROL-A-LIFTS

PICK IT UP
Move it
ANYWHERE!
Put it
ANYPLACE!



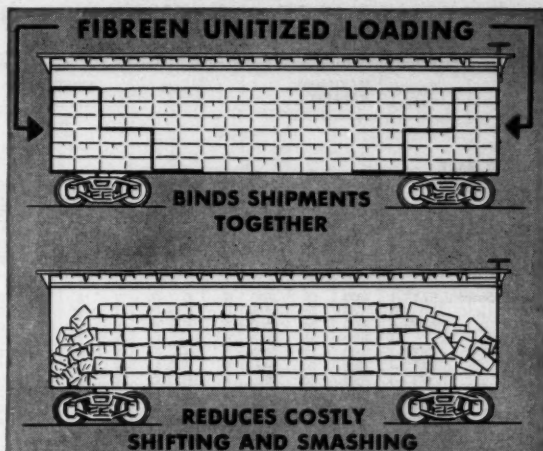
HANDLES LONG,
HEAVY, AWKWARD
CRATES OR MACHINES
WITH EASE AND SAFETY

The crated steel roller shown weighs 8,000 pounds. It's too bulky for a fork truck and a crane can't get at it. Formerly they skidded it on rollers. Now they slip a Rol-A-Lift under each end, raise it easily with the built-in hydraulic jacks and roll it anywhere. Load is lowered at controlled speed. Full-swiveling casters for easy maneuvering. Available in two, four, six, eight and ten thousand-pound capacities. Rol-A-Lifts can speed handling and reduce costs in your plant too! Write for folder and prices

SKARNES ENGINEERING & SUPPLY CO., INC.
2907 EAST FRANKLIN AVENUE
MINNEAPOLIS 6, MINNESOTA

Circle No. 30 on Card, Page 35, for more information
APRIL, 1953

STOP DAMAGE WITH THIS TOUGH, LOW-COST RETAINING PAPER



ON HUNDREDS OF SHIPMENTS

FIBREEN

IS REDUCING DAMAGE CLAIMS
60% TO 80%!

Waterproof, reenforced Fibreen—the toughest paper—holds shipments together as a unit, in spite of freight car jolting . . . humping and shunting.

Thousands of safe shipments are proof that unitizing loads with Fibreen is doing an outstanding job in preventing cartons, bags, etc. from being smashed in end-wells and voids.

Maybe it's the answer to your damage problems. Write to Dept. DA-4 today for complete details on unitized loading and information on Fibreen for packaging.



The **SISALKRAFT Co.**

Chicago 6, Ill.

New York 17, N. Y.

San Francisco 5, Calif.

Circle No. 31 on Card, Page 35, for more information

DA SPECIFICATIONS

LIFT TYPE—Pallet,

Lift Type, Stationary Platform and Towing Tractor models shown here and on Pages 96 and 97 were received too late for publication in their proper alphabetical order. Other specifications can be found on Pages 26 to 33

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY		Service Weight (Lb.) (Unloaded but including battery)	Operation Type	Power Type	Lift Type	MAST		OVERALL DIMENSIONS (In.)							TURNING RADIUS (In.)					
		Weight (Lb.)	Load Center (In.)					Extending?	Tilt		Length		Height		Width	Free Lift	Max. Lift Elevation	Lowest Underclearance	With Platform or Forks	Turns in Intersecting Aisle	Minimum Aisle for Right Angle Stacking	Three or Four Point Suspension
									Forward (Deg.)	Rearward (Deg.)	With Platform or Forks	Without Platform or Forks	With Mast Extended	No Extension Mast								
1	Lewis-Shepard, EFTT-1	1000	24	3800	R	E	Fk	Y	3	10	101½	85½	182	83	34	67	129	4½	59	119½	3	
2	..... 59	1500	24	4675	R	E	Fk	Y	3	10	105½	85½	122	86	34	62	99	4½	59	119½	3
3	..... EFTT-2	2000	24	6200	R	E	Fk	Y	3	10	105½	87½	182	83	34	67	129	4½	61	121½	3
4	..... 61	3000	24	6900	R	E	Fk	Y	3	10	105½	89½	150	83	34	65½	127	4½	61	122½	3
5	..... EFTT-3	3000	24	7000	R	E	Fk	Y	3	10	111½	75½	142	83	34	61½	127	4½	61½	128	3
6	..... EFTT-4	4000	24	7800	R	E	Fk	Y	3	10	111½	75½	142	83	34	61½	119	4½	61½	128	3
7	..... JFTT-1	1000	24	3005	R	E	Fk	Y	2	10	91½	55½	147	83	36	12	130	3	49	103½	3
8	..... JFTT-15	1500	24	3395	R	E	Fk	Y	2	10	91½	55½	147	83	40	12	130	3	49	103½	3
9	..... JFTT-2	2000	24	3485	R	E	Fk	Y	2	10	103½	67½	147	83	40	12	130	3	55½	109½	3
10	M-3-SF-36	3000	48	3650	R	E	Fk	Y	.....	.....	85	.....	145	83	42	14	127	2	71½	112	4
11	M-4-T	4000	30	2400	R	E	Pal	N	.....	.....	81-89	29	.....	.....	42	.....	4	1	.....	.....	4
12	M-4-W	4000	36	2400	R	E	Pal	N	.....	.....	59-101	29	.....	.....	42	.....	15	3	.....	.....	4
13	M-4-N	4000	36	2400	R	E	Pal	N	.....	.....	59-101	29	.....	.....	42	.....	7½	1	.....	.....	4
14	E-4-P	4000	30	1450	W	E	Pal	N	.....	.....	65-83	33	.....	.....	32	.....	7½	1	.....	.....	4
15	E-6-P	6000	30	1650	W	E	Pal	N	.....	.....	65-83	33	.....	.....	32	.....	7½	1	.....	.....	4
16	E-4-TP	4000	21	1400	W	E	Pal	N	.....	.....	57-75	33	.....	.....	32	.....	7½	1	.....	.....	4
17	E-4-W	4000	36	1600	W	E	Pal	N	.....	.....	55-97	25½	.....	.....	32	.....	15	3	.....	.....	4
18	E-6-W	6000	36	1600	W	E	Pal	N	.....	.....	55-97	25½	.....	.....	32	.....	15	3	.....	.....	4
19	E-4-N	4000	36	1500	W	E	Pal	N	.....	.....	61-97	25½	.....	.....	32	.....	15	3	.....	.....	4
20	E-6-N	6000	36	1600	W	E	Pal	N	.....	.....	61-97	25½	.....	.....	32	.....	15	2	.....	.....	4
21	E-4-SST	4000	24	3135	W	E	Fk	Y	.....	.....	65½	.....	144	83	38	124	1	65½	65½	4	
22	E-4-SOT	4000	24	3135	W	E	Fk	Y	.....	.....	62½	.....	120	71	34	101	1	63½	63½	4	
23	E-4-SPT	4000	28	2635	W	E	Pal	Y	.....	.....	62½	.....	144	83	38	129	2	62	62	4	
24	E-1-SCTL	1000	24	3495	W	E	Fk	Y	.....	5	75½	48½	148	83	32	14	130	3	40½	86½	4
25	E-1-S-SCTL	1500	24	3595	W	E	Fk	Y	2	10	92½	56½	147	83	40	12	130	3	50½	96½	4	
26	E-2-SCTL	2000	24	3615	W	E	Fk	Y	2	10	98½	62½	147	83	40	12	130	3	56½	102½	4	
27	E-2-S-SCTL	2500	24	3645	W	E	Fk	Y	2	10	104½	68½	144	83	40	12	124	3	62½	108½	4	
28	E-3-SCTL	3000	24	3645	W	E	Fk	Y	2	10	117½	81½	145	83	40	12	125	3	74½	121½	4	

For Abbreviations, see Pages 30 and 31

STATIONARY PLATFORM AND

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY			Service Weight (Lb.) (Unloaded, but including Battery)	Operation Type	Power Type	OVERALL DIMENSIONS (In.)				TURNING DIMENSIONS (In.)			Three or Four Point Suspension	TREAD (In.)		PLATFORM DIMENSIONS (In.)			
		Weight (Lb.)	Drawbar Pull (Lb.)	Trailing Load (Ton) (On dry level concrete)				Length	Width	Height	Lowest Underclearance	Turning Radius	Wheel Base	Turns in Intersecting Aisle		Front	Rear	Standard Length	Standard Width	Height of Back	Height from Ground
1	Automatic.....	HN-2	4000		4150	R	E	120½	39			104	68	71	4	26	34½	72	38		18
2		HN-3	6000		4675	R	E	126½	41			109	72	73	4	26	34	72	41		18
3		EN-2	4000		4275	R	E	105½	46		6	98	55	69	4	34½	34½	84	46		24
4		EN-3	6000		4225	R	E	107	45		5½	100	53	71	4	34	34	84	45		22½
5		FP-20	2000		1935	R	E	109	40		8	90	60	66	3		33½	60½	40		14½
6		FT	900	7	1500	R	E	46½	29		3½	48	30	37	3		24¼				
7		FTE	800	7	1580	R	E	52	29		3½	37	25	36	3		24¼				
8		BTN	2000		4650	R	E	68	36		6	60	41	50	4	8½	27				
9		MN	3000		5300	R	E	81½	40		3½	81	40	60	4	32	33				
10		BTW	2000		5840	R	E	81	42			107	67	67	4	31	35				
11		TR				RW	E	38½	30		2½				3		19				
12		TRH	800			RW	E	47½	32		2½				3		19				
13		TRLE				RW	E	49½	30		2½				3		18½				
14	Lewis-Shepard.....	E-6-T	6000	750	6	2000	RW	36½	32	28½	3	36½	28	29½	3	6	27				
15		J	6000	780	6	1885	R	36½	32		3	42½	28	29½	3	6	27				

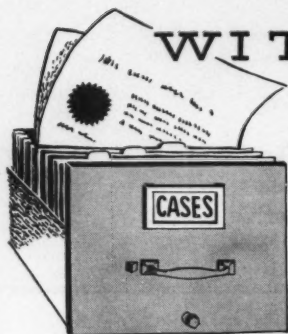
For Abbreviations, see Pages 32 and 33

-Industrial Trucks

Platform and Fork—(Concluded)

Lift Type, Stationary Platform and Towing Tractor models shown here and on Pages 96 and 97 were received too late for publication in their proper alphabetical order. Other specifications can be found on Pages 26 to 33

PLATFORM OR FORK DIMENSIONS (In.)					ENGINE OR MOTOR		BATTERY		TRANSMISSION		TRUCK SPEED								GRADE-ABILITY (Per Cent)		Dead Man Brake?	Line Number		
Standard Length	Standard Width	Height of Back	Height from Ground When Lowered	Lateral Adjustment of Forks	Make and Model	Horsepower	Normal Voltage	Ampere Hours	No. of Forward Speeds	No. of Reverse Speeds	Unloaded				Capacity Load				Unloaded	Capacity Load				
											Forward (mph)	Reverse (mph)	Lifting (fpm)	Lowering (fpm)	Forward (mph)	Reverse (mph)	Lifting (fpm)	Lowering (fpm)						
38	4	23	1 1/4	9-33	GE	30	275	4	4	4	5-8	5-8	50	35	5-8	5-8	45	45	15	10	Y	1		
38	4	23	1 1/4	9-33	GE	38	330	4	4	4	5-8	5-8	55	35	5-8	5-8	50	45	15	10	Y	2		
38	4	23	1 1/4	9-33	GE	30	350	4	4	4	5-8	5-8	50	35	5-8	5-8	40	45	15	10	Y	3		
38	4	23	2	9-33	GE	30	440	4	4	4	5-8	5-8	31	35	5-8	5-8	25	45	15	10	Y	4		
38	4	23	2	9-33	GE	32	450	4	4	4	5-8	5-8	32	35	5-8	5-8	27	45	15	10	Y	5		
38	4	23	2	9-33	GE	32	450	4	4	4	5-8	5-8	32	35	5-8	5-8	26	45	15	10	Y	6		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	7		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	8		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	9		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	10		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	11		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	12		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	13		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	14		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	15		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	16		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	17		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	18		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	19		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	20		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	21		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	22		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	23		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	24		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	25		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	26		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	27		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	28		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	29		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	30		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	31		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	32		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	33		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	34		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	35		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	36		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	37		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	38		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	39		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	40		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	41		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	42		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	43		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	44		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	45		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	46		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	47		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	48		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	49		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	50		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	51		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	52		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	53		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	54		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	55		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	56		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	57		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	58		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	59		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	60		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	61		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y	62		
38	4	23	2	9-33	GE	12	300	2	2	2	4-4 1/2	4-4 1/2	20	25	4-4 1/2	4-4 1/2	15	25	15	10	Y			



WITHIN THE LAW

By Leo T. Parker

Legal Consultant, Distribution Age

DISTRIBUTION AND MARKETING

The purpose of this piece is to assist readers to conduct their business by use of unambiguous written contracts and records in view of avoiding expensive legal controversies.

When a contract is written it is presumed that the agreement is conclusive.

In the late case of *A— Co. v. S—*, 108 N. E. (2nd) 29, higher court clearly held that when a contract is reduced to writing it is conclusively presumed that the written instrument expresses the entire contract between the parties, and all prior acts, promises and contemporaneous negotiations are excluded. This decision shows that persons who desire to prepare to win unavoidable law suits must have written contracts which clearly enumerate the exact obligations of both contracting parties.

Under these circumstances the court will not listen to or receive testimony as to "side" or verbal promises, guarantees or other agreements that tend to contradict the written contract. Quite obviously, therefore, business persons who rely upon verbal contracts, or partly written and partly verbal agreements, merely invite future litigations and uncertain verdicts. Once a written contract is properly signed it remains effective until absolute proof is given that it was legally cancelled.

For example, in *H— Co. v. M—*, 223 S. W. (2d) 110, testimony showed facts as follows: *M—* took employment as a salesman with the *H— Co.* The salesman signed a written contract of employment which contained a restrictive clause that *M—* would not for the period of one year from the termination of his employment engage "in the same or similar business" as that carried on by the employer in the territory over which his employment had extended.

After *M—* had worked as a salesman for several months, he was made sales manager. His employment as sales manager was purely by oral agreement, and his compensation was tentatively increased. After several

months, he resigned and took employment with a competitor. The former employer then filed suit and asked the court to issue an injunction to prevent *M—* from continuing employment with the competitor.

M— argued that he was not obligated by the restrictive clause because later, by verbal contract, he was employed as a sales manager. However, the higher court held that since the first and previous employment contract had not been cancelled, he was obligated by the restrictive clause in the written contract.

Verbal or parol evidence does not affect the terms of a written contract.

In *S— Corp. v. S— R— Co.*, 181 Fed. (2d) 960, the higher court in effect, held that a written contract stands "on its own bottom." In other words, this higher court held that verbal or parol evidence is not admitted as evidence to vary the written contract. This court said:

"The attempts to vary the terms of this written instrument by parol testimony were correctly denied. The parol evidence was properly excluded under the parol-evidence rule."

Other higher courts have held that a contracting party may eliminate future controversies by inserting in a written contract a clause, as follows: "It is agreed that this written contract is the full and complete agreement between the contracting parties, and that all verbal agreements, promises and guarantees made by either or both contracting parties are hereby cancelled and this written contract is substituted therefor."

If a written contract is ambiguous, what are the legal rights of contracting parties?

According to a late decision a written or printed contract, if ambiguous, always is construed by the courts most strongly against the party who wrote it.

For example, in *S— v. P—*, 43 N. W. (2d) 449, it was shown that a manufacturer sued a former distributor of its appliances. The bases of the suit was a printed contract

prepared by the manufacturer. This court held:

"If it is ambiguous, it appears from the record that both the distributor and consumer agreements were executed upon printed blanks furnished by the plaintiff (manufacturer), and it is a recognized rule of law that a written contract should, if ambiguous, be construed most strongly against the party preparing it."

TRANSPORTATION

In insurance contracts, does an agent's promise guarantee insurance company liability?

Not so long ago an official of a large transportation company wrote: "Recently we have had some difficulty in collecting insurance on various policies issued by reliable insurance companies. In all of these cases the insurance company's representative or adjuster shows us that our policies actually did not cover the particular losses. Nevertheless, we contend that the insurance company is liable because when the company agent took our contract we explained to him the exact coverage we desired. He assured us that he would have a policy issued by his company to insure us fully."

"Later we found that this agent was new in the business and apparently that is the reason our policies did not give full insurance coverage."

Irrespective of inexperience of an insurance agent employed by an insurance company, here is the law: An insurance company is liable for promises made by a general insurance agent, but it is not liable for promises made by an ordinary or special insurance agent.

The higher courts have established law that a special insurance agent is the agent of the insured, not agent of the insurance company. Hence, the insurance company never is liable nor responsible for promises or errors made by an ordinary or special agent.

A majority of business persons are very careful to read ordinary contracts but very dilatory in reading their insurance policies. Actually an insurance policy is a contract under which the insurance company agrees for the paid premium to assume certain and well defined risks. The average business person simply tells his insurance agent the kind of insurance policy he wants and trusts the agent to supply the proper and protective policy. This is poor business methods.

All readers should remember this: Irrespective of what an insurance agent tells you and no matter what protection you believe your insurance policy affords, you must rely exclusively upon the protection explained and defined by the insurance policy.

See *W— v. Virginia*, 55 S. E. (2d) 259, where an insurance policy insured all his motor vehicles "when operated within a radius of 200 miles of the place where the trucks are principally garaged."

(Please Turn to Page 142)

and Firms are Arranged Alphabetically

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Washington DA

(Continued from Page 15)

further—a system of self-liquidating superhighways, not only from coast-to-coast but also from border-to-border. Also coming up again is the proposal to build a super-road traversing the length of the Mississippi valley from Minnesota to Louisiana.

Government Barge Lines

The government will shortly get out of the inland waterways shipping business if the Commerce Department's plan for selling fed-

erally owned barge lines goes through. Secretary Weeks has had the department busy assembling the necessary information on which more than two-score interested bidders can base firm offers. Lines up for sale provide industrial shipping service in the Mississippi and Missouri valleys, along Alabama's Warrior river, and shuttle railroad also in Alabama.

Automotive Taxation

Views in Congress on what to do about the federal excise taxes now tacked onto trucks and other motor vehicles, tires and tubes,

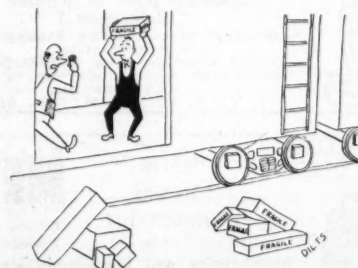
and parts vary widely—so widely that nothing may come of attempts to have them removed or at least reduced this year. Some members want them scrapped entirely. Some merely ask for reduction in the tax rate. Still others would retain them at present rates but have them earmarked for roadbuilding purposes.

Considerable support has been building up for their elimination entirely. Statistics compiled for Rep. Charles G. Oakman, Michigan Republican, who has introduced a bill (H.R. 3186) to repeal automotive excises, indicate that this indirect taxation adds 10 per cent to the wholesale cost of motor vehicles—thereby adding more than \$1.1 billion annually to the industry—consumer tax payments.

Truck Body Experiment

Department of Defense last month began testing out at the Aberdeen Proving Ground, three recently developed types of wooden truck bodies. Features of these new type of bodies include incorporation of the aircraft engineering principle of "stressed skin construction" which consists of a frame made of bent laminated black gum veneers with plywood glued over both sides of the rigid members. All lumber used is pressure treated with a solution to prevent decay and fungus attack. This is followed with a moisture repelling treatment for protection against wood swelling and shrinkage.

(Resume Reading on Page 19)



"Hey, can't you read? Throw that on the FRAGILE pile."

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Tire Maintenance Tips

In its booklet, Industrial Tire Guide for Users of
Materials Handling Equipment, B. F. Goodrich has
presented the following 10 rules to help cut tire costs:

1. AVOID OVERLOADING. Overloading causes
tires to cut and chip easily, separate from their steel
base, wear faster and fail prematurely. Follow the
manufacturers' recommendations for carrying ca-
pacity.
2. CENTER TIRES CORRECTLY on wheels to
avoid splitting of steel base and separation of rubber
tread from steel wheels. Avoid overhang of any more
than 1/4 in. in outside position. If wheel is not wide
enough to properly support the steel base of the tire,
a steel supporting ring should be used.
3. KEEP RUNWAYS CLEAN. Eliminate the
source of tread-cutting and bruise damage and your
tires will last longer.
4. REGULAR LUBRICATION of all moving wheel
parts, including power and brake systems, assures
free-rolling and eliminates tire drag in starting and
stopping.
5. AVOID ACIDS, OILS, GREASE, GASOLINE.

These materials damage rubber. If tires come in con-
tact with these rubber-killers, wipe them off without
delay.

6. AVOID EXCESSIVE HEAT. Rubber tires on
equipment that is stored or operated in excessive heat
deteriorate quickly.

7. SELECT THE RIGHT TIRE for the job it has
to do.

8. INSPECT TIRES REGULARLY. Remove all
sharp objects picked up by treads before they have a
chance to cut further into the rubber or do additional
damage. Check tires carefully once a day, or once
during each shift if the vehicle is used continuously.

9. AVOID SHARP TURNS and eliminate tread
scraping and excessive strain between solid tire and
steel base or pneumatic tire and rim. A tire turned
too sharply tends to twist object into the rubber, like
a screw is twisted into wood. Avoiding sharp turns
also prevents cargo damage through load shifting,
overturning, etc.

10. LINE TRAVEL ROUTES. Marked routes
serve as guides in steering vehicles and can serve as a
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Within the Law

(Continued from Page 114)

One motor truck was driven a distance of 300 miles from the garage, where it was involved in a collision.

The higher court decided that the vehicle owner could not recover the loss from the insurance company.

And again see *S— Corp. v. T— Indemnity Co.*, 30 S. E. (2d), 377. Here it was shown that a business person requested an insurance agent to issue a policy covering robbery insurance on the outside and on the inside, and also burglary insurance. The insurance agent went so far as to notify the insured by letter that the policy included the complete and desired coverage. However, when a loss resulted from burglary the insurance company refused payment, and the policy holder filed suit.

The higher court refused to hold the insurance company liable saying that when an insured receives a policy which does not conform to representations made by the company's agent he must notify the insurance company of the error within a reasonable time.

Retention of the policy by the insured without objection is regarded by the higher courts as an acceptance of the policy with the protection limited by wording of the policy.

On the other hand, the higher courts hold insurance companies absolutely liable on insurance policies

where the testimony shows these facts: The insured mortgaged the property and imparted this information on the policy to the insurance company, and received from the insurance company an endorsement attached to the policy; the insured correctly stated the true and actual value of the insured property; the insured kept books required by the insurance policy; the insured changed the location of insured merchandise and notified the insurance company's general agent and received an endorsement to be attached to the policy; the insured complied with the clause in an insurance policy which required the books of the insured to be kept in a fire proof safe; the insured complied with an insurance policy's clause which prohibited sleeping quarters in the same building where the insured merchandise was stored; the insured complied with state laws regulating repairs and maintenance of a building to eliminate fire hazards; the insurance policy clearly describes the location of insured merchandise or property; the insured did not negligently cause the loss; the insured did not make a false statement on the application for insurance; and the insured did not increase the risk assumed by the insurance company.

Failure of the insured to comply

with any one of these policy requirements will result in the insurance policy being void.

On the other hand, the courts will not permit an insurance company to avoid its assumed liability as expressed broadly in the insurance policy.

WAREHOUSING

If the owner of stored goods knows of impending disaster, must he act to prevent damage?

Modern higher courts hold that if the owner of stored goods knows his goods are in danger of being lost, destroyed or damaged, it is his duty to exercise due diligence and care to protect his own goods against injury.

Also, a recent higher court held that a warehouseman cannot be held liable for damage to stored goods, if the owner had access to general information, or knowledge, that his goods were in danger and failed to protect them. In other words, general knowledge of a disaster which endangers stored goods, relieves a warehouseman from liability for failure to notify the owner, or otherwise exercise unusual care.

For example, in *G— S— Co. v. P—*, 59 So. (2d) 485, the testimony showed the facts as follows: The owner of shrimp, named P—, stored same in a warehouse. A hurricane and flood flooded the ware-

and Firms are Arranged Alphabetically

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house and damaged the stored merchandise, including the shrimp. P— agreed that the warehouseman could not be liable for the loss of the shrimp, caused by an act of God, but he argued that the warehouseman was liable because he had not given him, P—, any notification to enable him to salvage what he could after the hurricane.

It is important to know that the higher court refused to hold the warehouseman liable, and said:

"The hurricane and flood was a matter of general knowledge, front page news for many days. P— could hardly have avoided knowledge of it. At any rate, P— did not show how he could have salvaged the shrimp."

A warehouseman who gives up stored goods forfeits his normal right to first lien.

Generally speaking, a warehouseman who gives up possession of stored goods automatically forfeits his normal right to a first lien to secure pay-

ment for storage and other charges. However, according to a late higher court decision, a warehouseman who involuntarily gives up possession of stored goods, does not forfeit his lien.



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For example, in *M— v. United States*, 104 Federal Supp. 506, it was shown that a warehouseman stored goods for a company, which later became bankrupt. During the bankruptcy proceedings, the warehouseman was compelled to give up possession of the goods.

The Federal Court held that the warehouseman had not forfeited his lien by involuntary surrender of the stored goods.

When is a warehouseman not liable to loss or damage to stored goods by fire?

A reader asked this question: "Please give me the law as to when a warehouseman is not liable for loss or injury to stored goods by fire? If a warehouseman pays a night watchman who gets drunk and neglects his duty causing a fire, is the warehouseman liable in damages to owners of stored goods?"

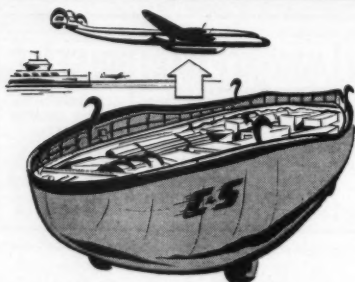
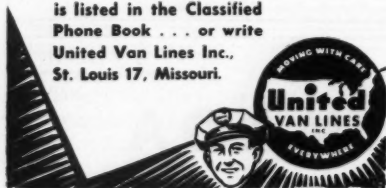
The higher courts consistently hold (Please Turn Page)



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Within the Law

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that a warehouseman is not liable in damages for loss of stored goods resulting from fire, unless the testimony indicates conclusively that the loss resulted from his negligence. Therefore, if stored goods are destroyed by fire as a result of a night watchman getting drunk and leaving the warehouse, or starting a fire, it is my opinion that the warehouseman is not liable, if the watchman had a good previous reputation. See the following cases: 111 S. W. (2nd) 867; 237 S. W. 931; 109 S. 20; 297 S. W. 670; 116 S. 387; 6 S. W. (2d) 1086.

Under what circumstances is a warehouseman liable for conversion of goods?

Under ordinary circumstances a warehouseman always is liable for conversion if he either permits a husband or wife to take delivery of stored goods owned by the other, or if he sells stored goods for storage charges without giving the lawful owner proper legal notification.

In other words the higher courts consistently hold that a warehouseman always is liable for conversion if he sells stored goods without sending the true owner of such goods a notification which conforms with statutory requirements, or if he fails to advertise the intended sale of the goods in strict accordance with the law.

For example, in State v. T—, 135 S. W. (2d) 363, it was shown that a wife made arrangements with a warehouseman to store her goods. Later she left the city in which the warehouse is located, but her husband remained in the city. On several occasions the husband paid the storage charges, but he discontinued payments and subsequently the warehouseman advertised the goods for intended sale, sending the husband a usual notification to his last known address. The warehouseman sold the goods after proper legal procedure.

When the wife learned that her goods had been sold she filed suit against the warehouseman to recover the value of the goods. The higher court held the warehouseman liable and said:

"Here Mr. T— (husband) was neither the owner of the goods, nor was he the person on which account the goods were held, but it could hardly be suggested . . . that the warehouseman might be permitted to evade his duty to notify the real person in interest . . . The fact remains that if she (wife) had been given due notice by defendant (warehouseman) she would have had an opportunity to protect herself against the consequences of her husband's failure to have kept the storage charges paid."